






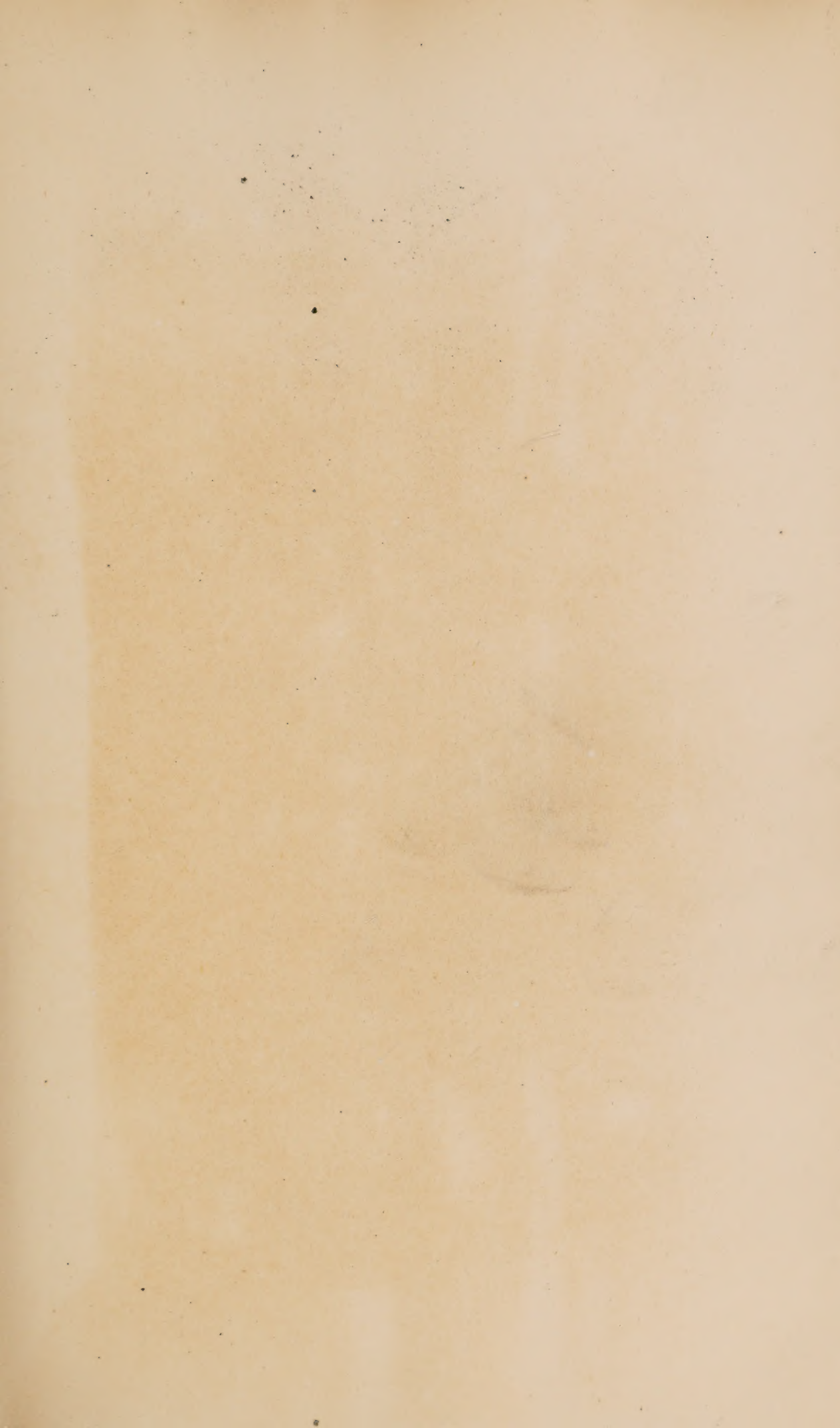
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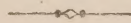




TRANSACTIONS

OF THE

Odontological Society of Great Britain.



VOL. XI.—NEW SERIES.





TRANSACTIONS  
OF THE  
ODONTOLOGICAL SOCIETY  
OF  
GREAT BRITAIN.



VOLUME XI.—NEW SERIES.

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## ORDINARY MONTHLY MEETING,

*November 4th, 1878.*

ALFRED COLEMAN, Esq., PRESIDENT, IN THE CHAIR.

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AFTER a short address from the President, the Minutes of the June Meeting were read and confirmed.

Mr. W. STORER BENNETT then signed the Obligation Book, and was formally admitted to Membership by the President.

The following gentlemen were balloted for and unanimously elected Members of the Society, viz. :—

J. C. FORAN, Marshfield-house, Eastbourne, Sussex, Non-resident.

GEORGE HOCKLEY, 45, Great Marlborough-street, Resident.

WILLIAM WEST, 9, Ackerman-road, Brixton, Resident.

J. W. WORSTER, 27, Newington-crescent, Kennington-park-road, Resident.

W. T. WOODS, 25, Chowringhee, Calcutta, Non-resident.

The PRESIDENT acknowledged the receipt of Mr. James Stocken's work on "Dental Materia Medica and Therapeutics," presented by the author for the Library.

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The SECRETARY then read the following communication from Mr. ALEXANDER DE LESSERT, explanatory of a specimen sent by him for exhibition :—

MR. PRESIDENT AND GENTLEMEN,

THE specimen which I have the honour to bring before your notice was one found in a peat moss in Banffshire: it was discovered by some labourers when "cutting peats" for fuel, at a depth of five or six feet below the surface; and, strange to say, the only portions of the body found were the skull, lower jaw, and axis and atlas of the vertebræ, probably those of a female about middle life. When first examined, the head was covered with long flaxen hair, and portions of the skin clung about the then perfect bones like thin parched leather; but after exposure to the atmosphere this readily crumbled away, or was detached. When I procured the specimen it had lain for some years in a stable, carefully preserved by the scientific man-servant of a country medical practitioner, to whom it had been sent for examination.

The specimen consists of:—

*All the bones of the skull (except the frontal and two parietal) in a more or less perfect condition.*

*Upper jaw containing three molars.*

*Lower jaw containing two molars.*

*Alveoli complete, with all the sockets for thirty-two teeth perfect. No trace of enamel on teeth.*

*Right temporal: styloid process complete.*

*Second cervical vertebra complete.*

*Weight of all the bones, 3 oz. 76 grs.*

*Colour: dark reddish-brown.*

*No lime salts.*

I should hardly have ventured to exhibit it before this Society had not my name appeared so prominently before you for so doing (the result of a slight misunderstanding on the part of our worthy secretaries); for I consider it to be a subject of less dental than of medico-legal or of antiquarian interest. I trust, therefore, that you will kindly bear with me if my few remarks upon it are more general than of a dental scientific description.



Doubtless of remote antiquity, the chief point of interest lies in the peculiar condition in which it is preserved ; and I would request you to observe its colour and weight ; the entire absence of its lime salts ; the general shrinkage of all the bones (especially the lower jaw, as best seen when the distance between the condyles from each other is compared with the distance between the glenoid fossæ) ; and also the fine development it must at one time have presented.

Moisture is absolutely necessary for the formation of peat moss, for if drained of superfluous moisture it ceases to grow, and the more recently dead plants undergo putrid fermentation, and are reduced to vegetable mould. It is also absolutely necessary that the water of a peat moss should be *stagnant*, for wherever a rivulet is allowed to overrun the surface, the upper layer is converted into vegetable earth, the moss or peat disappears, and a fertile soil occupies its place, though the sub-soil remains in its original state. Peat moss does not undergo putrid fermentation, nor does the stagnant water contained in it. No living creature exists in peat moss, and it is evidently possessed of antiseptic and embalming qualities, for ligneous and aquatic plants lodged in it are found in a state of unusual preservation ; and, as may be seen by the specimen before you, animal tissue becomes leather-like and durable.

According to Dr. Rennie (" Essays on the Natural History and Origin of Peat Moss," Ramsay & Co., Edinburgh, 1810, to which book I am indebted for information on this subject), peat moss contains carbonic, gallic, and sulphuric acids, iron and tannin. It is, therefore, likely that the colour of this specimen is due to the action of iron, the antiseptic qualities of moss-water to carbonic acid and tannin, and that the sulphuric acid has dissolved out all the lime salts, thereby rendering the bones compressible and subject to shrinkage.

I cannot conclude without venturing an opinion that the chemical and general uses of peat moss have been much overlooked ; and I do so more especially at a time when geologists foretell a diminution of our coal supply.

In support of my opinion I may remark that, after careful research, the only work I could find on the subject was the one quoted, written by a country clergyman nearly eighty years ago.

ALFRED ALEX. M. LESSERT.

220, UNION STREET, ABERDEEN,  
*October, 1878.*

Mr. BREWSTER then exhibited an improved vulcanizer and celluloid apparatus combined, and explained its advantages.

Mr. LYONS showed, for Mr. ADOLPHUS ALEXANDER, a model of an upper jaw, showing a large perforation of the palate caused by wearing a plug, and read the following notes of the case. The patient, a cabman, had met with an accident nine years ago, by which he fractured his jaw. He was treated at St. Bartholomew's Hospital, and a good result obtained, except that a small opening was left in the hard palate. This the patient used to plug with dry lint, the pressure of which gradually enlarged the hole, so that when seen by Mr. Alexander the whole of the hard palate had disappeared, and a considerable part of the alveolar process had also been absorbed. The patient had been sent to Mr. Alexander to be fitted with an artificial palate.

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## DISCUSSION.

The PRESIDENT.—In May of this year a boy died from the effects of chloroform, which had been administered for the extraction of two or three teeth. The Editor of the *British Medical Journal*, in commenting on the case, remarked :—"Is it ever right to use Chloroform for Dental purposes? We wish the Odontological Society would pronounce an authoritative opinion on that subject, and we should hope that, if they were to do so, they would absolutely forbid it." As President of the Society I wrote to the Editor saying that I quite appreciated the importance of the question, and would do my best to bring it before the Society at an early meeting for discussion. It is well known that the Editor of the journal in question has for a long time past taken a deep and laudable interest in deaths from chloroform, with the object of, if possible, ascertaining their cause and lessening their occurrence, and it appeared to me the Society could hardly refuse the responsibility suggested, provided, in discussing so important a question, it could secure the co-operation of gentlemen in London, who are recognized as the highest authorities on all matters connected with anæsthetics.

The question is undoubtedly one of great importance; a death, the result of a street or railway accident, lamentable as it may be to the individual or those who may deplore the loss, bears little comparison to a death occurring under skilled hands—those to whom has been committed for the time being the reins of life of a fellow-creature committed confidently to their trust by the patient or his guardians; and therefore to administer a dangerous agent unnecessarily or incautiously is to assume a very serious responsibility. Whatever may be our verdict this evening, if verdict we arrive at—not in regard



to the death alluded to, for that is not now before us, but the query of the Editor of the *British Medical Journal*, we shall, doubtless, be unanimous on one point, viz., in admitting the praiseworthiness of that gentleman for his efforts to lessen these calamitous occurrences. It was suggested to me that the Society might on this occasion also profitably discuss some other important questions bearing on the same subject, and these have already been placed in your hands. I think, however, it will not be well to mix them up with that I have named, but discuss this first and separately, and afterwards the others, should time permit.

I am happy to see present this evening a number of gentlemen, acknowledged authorities on the subject of anæsthetics, whose presence cannot but give an importance and authority to our proceedings; I regret, however, the absence of Mr. Clover, who is unable to attend, but he has kindly favoured me with a letter, which our Secretary will now read.

Mr. CLOVER's answer to the question was as follows:—"I think chloroform may be justifiably given in cases of dental operation in which complete quietude of the patient is necessary for more than two minutes. Ether would be somewhat less dangerous; but in cases of this kind it is very difficult to keep the patient absolutely quiet: the bleeding also is considerably increased when ether is used."

Mr. J. BROWNE-MASON, of Exeter, had also expressed his opinion in a letter to the President. He wrote—"To the question, 'Is it justifiable to administer Chloroform for Dental operations,' I would say that, if anæsthesia by chloroform is justifiable at all, it is as much so in dental operations as in any other. Nitrous oxide gas does not answer for prolonged operations, such as the removal of several diseased stumps, by reason of the transitory nature of its effects, so that there is nothing left except ether or chloroform. I have seen more of chloroform than of ether, and have never witnessed any untoward symptom from its use, in a practice extending over twenty

years ; but as ether is undoubtedly the safer, I think that the preference for our purposes should be given to it when more prolonged anæsthesia is required. I usually point this out when called upon to select an anæsthetic, but from its having reappeared in our consulting-rooms at a comparatively recent period, I have seen less of its application than I have of chloroform. I am truly glad our Society is about to discuss this all-important question, and shall be prepared loyally to carry out any suggestions emanating from such a source. I await with impatience the report of the meeting, since I am unable to be present."

Mr. F. WOODHOUSE BRAINE said that he quite agreed with Mr. Clover's answer to the question. He considered that the use of chloroform was justifiable in cases where a safer anæsthetic was not applicable, as in prolonged operations. It was true that chloroform occasionally caused fatal results, but diseases of the mouth which were sufficiently serious to require the use of chloroform were themselves occasionally fatal ; such operations were not mere matter of expediency. As bearing on the subject under discussion, he would call the attention of the Society to the death of a child only two years and four months old, whilst under chloroform, which had happened only a few days previously : the child died quite suddenly from failure of the heart ; only half a drachm of chloroform had been used. These were the worst cases to deal with ; death occurred without warning, and there was no time for any restorative measures. In cases where the patient looked bad but was brought round by artificial respiration, the heart was not primarily affected.

Mr. JOHN TOMES.—I have had considerable experience in the use of both chloroform and ether, and at one time was in the habit of administering chloroform frequently myself. I have found both ether and chloroform very useful, and have never seen any serious ill effects from either of them : I am not, therefore, disposed to condemn them.

Mr. G. H. BAILEY.—All must feel that Mr. Clover is a great authority, and that the opinion which he has expressed is entitled to great weight. My own opinion is that gas is the most suitable anæsthetic for dental operations; that if gas is not available, ether is better than chloroform; but that if prolonged insensibility is required, chloroform must be resorted to, in spite of the fact that death occasionally occurs under its influence. I lately met with a case in which first gas and then ether was given, but the operation could not be completed; chloroform was then given, and the dentist at last succeeded.

Mr. HENRY BARRETT.—I did not come prepared to take part in this discussion, but as the President is anxious to hear my experience of anæsthetics I will state it briefly. About the year 1846 we began to be called upon to give ether for dental operations; we accordingly did so, and continued to do so with safety and satisfaction for some years, when it was suddenly found that ether was dangerous. Then chloroform was had recourse to, and we gave chloroform for some fifteen years without any trouble or apparent danger, when all at once it was discovered that chloroform was still more dangerous, and one authority went so far as to say that any one who continued to administer chloroform in spite of the evidence which had been collected against it, ought, in the event of a fatal result, to be committed by the coroner on a charge of manslaughter. But, notwithstanding all this strong language, I can only say that I have never seen any danger myself, and, whilst advocating the utmost care and caution in its use, I do not feel disposed to condemn chloroform altogether.

Mr. JONATHAN HUTCHINSON.—My experience may be briefly stated as follows. Having been on different occasions patient as well as administrator, I consider the superiority of nitrous oxide gas over other anæsthetics very decided. I would allow any person who had some experience in the use of nitrous oxide to give it to me, but I would not allow any one to give



me chloroform, and would take ether only from a thoroughly qualified person. As to ether and chloroform, I have given both largely: I lost one patient eighteen years ago from chloroform, and have had many alarming cases in which the patients were only saved from impending death by prompt and vigorous measures. I have had to keep up artificial respiration for a quarter of an hour, and I have seen fatal cases under the care of others. About ten years ago, Mr. Darby, of Boston, U. S., gave ether at the London Hospital, but it was not at once adopted. A year or two later, Joy Jeffries, another American dentist, gave ether at Moorfields and elsewhere, and since then I have rarely used chloroform. During the six years that I have used ether I have had no alarming cases in my own practice. I have seen bad cases, but these have always happened when some complicated apparatus has been used by which the patient re-inhales his own breath, and thus takes in a quantity of carbonic acid as well as ether. I have quite given up all these arrangements, and use nothing but a leather mouth-piece perforated at the top, with a sponge in it, and a clean towel; I give the patient plenty of air and plenty of ether. With ether given in this way I have never had any bad symptoms and never feel the least anxiety, whilst I always felt anxious when chloroform was being given; I am therefore strongly in favour of ether. There certainly are a few cases in which chloroform is preferable; viz., for old people over sixty and for very young children. Old people do not always recover readily from ether narcosis. One old gentleman who was under my care died three days after an ether inhalation; he continued stupid and heavy, never quite recovered consciousness and gradually sank. In another case there was alarming continuance of insensibility. Chloroform seems to be less dangerous than ether in elderly people, and in the case of infants there seems to be no danger, whilst it is most dangerous to young people. At Moorfields there used to be on an average about one death from chloroform every year, and they were mostly young subjects operated on for

strabismus. Chloroform is certainly more convenient and pleasanter ; patients who have taken both almost invariably prefer it ; but I consider it criminal to place a patient in danger of losing his life by giving chloroform, when ether has been found to be so much safer.

The PRESIDENT.—Mr. Hutchinson's remarks refer, of course, to general surgical practice. I should like to ask him whether he does not think that there are some points connected with dental operations which entitle them to special consideration.

Mr. HUTCHINSON.—I can't at this moment call to mind any point in which dental operations differ materially from those in general surgery : I think, therefore, that the opinions I have expressed are equally applicable to them.

Mr. MILLS.—Briefly expressed, my answer to the question which has been put would be, "Yes, in certain cases." At the same time, I don't consider chloroform the most suitable anæsthetic for dental operations generally. Nitrous oxide is the best in the majority of cases, and next to it comes ether. When more prolonged insensibility is required than can be obtained by means of nitrous oxide, I prefer the plan of supplementing this by ether ; the gas and ether inhalation is not attended by the danger of syncope, which is the chief cause of anxiety in giving chloroform. At the same time, there are undoubtedly cases in which chloroform is the best agent. As Mr. Hutchinson has stated, it is best for old people, especially if they have any tendency to bronchitis : it is best also for long operations. I have certainly seen more bad cases from chloroform than from either gas or ether, and it requires more care in its administration ; but I still consider its use quite justifiable in suitable cases.

Mr. F. W. BRAINE.—I wish to call Mr. Hutchinson's attention to some important points in which dental differ from ordinary surgical operations in regard to the use of anæ-

thetics. In the first place the mouth has to be kept wide open, and must be left free for the use of the operator; hence it is impossible to regulate the amount of air which the patient inhales. When a patient is once under the influences of chloroform insensibility can be kept up by the use of a nose-piece, alone, but to keep the patient under the influence of ether without at the same time embarrassing the operator is a difficult matter. Then, again, ether causes profuse secretion of saliva, which collects in the floor of the mouth, and in the case of operations on the lower jaw is apt to annoy the operator by obscuring the view. The increased hæmorrhage to which Mr. Clover has referred, though not of much consequence to the patient, hinders the operator in the same way by obscuring the parts. These are the chief objections to the use of ether as an anæsthetic for dental operations.

Mr. CHARLES TOMES.—I think I shall best save the time of the Society if I state briefly what my practice is, and leave my opinions to be inferred from this. I never advise a patient to take chloroform, and I never allow a patient to take it, or a doctor to give it, at my house. If a patient wishes to take chloroform, and I think the case requires it—such cases are very rare—I make him take it *in bed at his own house* and observe all the precautions as regards abstinence from food, &c., which are usual before the performance of other surgical operations. Given in this way, there is not only, I believe, less risk to the patient, but in the event of a fatal accident there would certainly be less blame to the dentist, all possible precaution having been taken. With reference to what has been said as to the unsuitability of ether for dental purposes, I can only state that I saw several cases of cleft palates operated on at the New York Hospital under ether, and that the patients were kept well under its influence, without in the least impeding the operations of the surgeon: all trouble from the bleeding was obviated by laying the patient on his side, so that the blood ran into the cheek and out at the angle of the mouth. With this evidence before



me, I may be pardoned for saying that I consider the adaptation of ether to dental requirements to be merely a question of management.

Mr. BIRD thought that the use of any kind of anæsthetic in dental operations might generally be regarded rather as a luxury than a necessity. Nitrous oxide gas was certainly the most generally suitable; even somewhat lengthy operations could be completed by means of successive administrations. No reference had been made to bichloride of methylene, yet he considered it preferable to chloroform in many respects for dental purposes. He thought it had been proved by experience that the sitting posture usual in dental practice did increase the risks of chloroform administration, and therefore quite agreed with Mr. Tomes as to the precautions which should be taken.

Mr. WOODHOUSE.—I shall adopt Mr. Tomes's suggestion, and state only my usual practice with regard to anæsthetics. My practice, then, is to use nitrous oxide gas on all possible occasions; if there are several teeth to be removed I have the gas administered a second, third, and fourth time, if necessary, on different days. I used to give chloroform in such cases and to remove all the teeth at one sitting, but I now feel that chloroform should not be given in any case where nitrous oxide can be made available. Still, cases do occur in which nitrous oxide is useless, on account of the brief duration of its anæsthetic effects, and I consider that we are then as fully justified in giving chloroform for a dental operation as others are in using it in ordinary surgical practice.

Mr. UNDERWOOD.—I think the following facts will be of interest as bearing upon the subject under discussion. During the eight years following the adoption of nitrous oxide gas as an anæsthetic at this hospital, I believe I am correct in saying that chloroform was never once used. In private practice I have during the same period been obliged to use chloroform three times. I think that these facts prove that though we cannot assert that the use of chloroform in dental practice is

never justifiable, still the occasions on which it is necessary are very rare. In the great majority of cases I use nitrous oxide, in others nitrous oxide and ether. I quite agree with Mr. Woodhouse that there is nothing gained by taking out a large number of teeth at one sitting, and I agree with him also in thinking that in exceptional cases chloroform may be given ; but I believe that the cases in which this is necessary occur very, very seldom.

Mr. PEDLEY said that, after hearing the use of chloroform in dental practice condemned by high authorities as it had been that evening, he could not help feeling somewhat guilty, for he had given chloroform twice during the past two months. And yet on consideration he thought that, as a M.R.C.S. and having had some experience in the use of anæsthetics, he was justified in what he had done. Both were cases of impacted wisdom-teeth, and their elevation and extraction was a very troublesome business, occupying in each case about a quarter of an hour. Gas was of course quite useless, and he personally found it very difficult to keep a patient under the influence of ether with the mouth gagged wide open, as was necessary in such cases as these. It might be a long time before he met with another similar case, but having so recently experienced the value of chloroform, he did not feel disposed to answer the President's question with an unconditional negative.

Mr. HUNT.—I used at one time to give chloroform four or five times a day, but for the last ten years I have used nitrous oxide gas almost exclusively, and have only used chloroform twelve times during the whole of that period. I have seen one death from bichloride of methylene, several narrow escapes from chloroform, and one very narrow escape from nitrous oxide. The use of ether for operations in the mouth is certainly difficult. My opinion is, then, that though in nearly all cases nitrous oxide will do, there are cases in which the use of chloroform is necessary, and that we are perfectly justified in using it for these exceptional cases.

Mr. SEWILL.—Towards the end of my studentship at St. Mary's Hospital two deaths occurred from chloroform; in both cases it was given for some trivial operation, and in neither could any disease be found to account for death. These accidents impressed me deeply on entering practice. I chanced also about that time to come in contact with Dr. B. W. Richardson, and his arguments helped to confirm the impression. I thoroughly agree with all that Mr. Charles Tomes has said as to the rarity with which chloroform is required in dental practice and as to the precautions which should be taken when it is used. I give nitrous oxide myself constantly, but I have not yet met with a case in which, according to my ideas, the use of chloroform was justifiable.

The PRESIDENT.—All those who have taken part in this discussion seem to agree in thinking that no hard-and-fast line can be laid down with regard to the use of chloroform in our profession, but all seem also agreed that its use should be restricted to very exceptional cases.

Mr. DENNANT.—I think it would be a mistake for us to express any definite opinion on this question. This meeting is composed chiefly of practitioners resident in or near London; consultations are easy matters for them, and they can readily obtain the services of experts who are thoroughly conversant with the use of whatever anæsthetic they may prefer. But with dentists practising in the country the case is different; they have only country surgeons to deal with, and must conform to their usages. Although gas and ether have been for some years before the profession, their use is not yet generally understood in the country; chloroform is still in many parts the only anæsthetic employed. I repeat, then, that I do not consider this meeting to be a fairly representative one for the purpose, and I think it would be a mistake for us to put forth our opinion on such an important question as that of the Society at large.



Mr. J. TOMES.—I think, Sir, that the decision of this question should not fairly be thrust upon us dentists ; it is one for the whole medical profession to decide, and the terms of the question should not be, “Is the use of Chloroform justifiable in Dental operations” only, but “in minor surgical operations generally?”

Mr. WALKER said that he agreed with Mr. Braine that chloroform was preferable to ether for dental operations ; the patient could be kept under its influence so much more easily. He had given ether a fair trial, but had not found it satisfactory. He therefore gave chloroform when he thought it advisable, but always had the patient in the recumbent position, and with every band unloosed. He thought, in fact, that the same precautions should be taken as if a capital operation was about to be performed.

The PRESIDENT said that, after the opinions which had just been expressed, he could not urge the Society to pass any definite resolution. No doubt practitioners in the country had less facilities for consultations and often less efficient assistance in the administration of anæsthetics than those who resided in London and other large towns could command. One point at all events had been clearly established by the unanimous agreement of those who had taken part in the discussion, viz., that chloroform should be reserved for very exceptional cases, and should never be given in cases for which other and safer anæsthetics were available.

The PRESIDENT then announced that at the next meeting Mr. Christopher Heath would read a paper on “Two Cases of Hypertrophy of the Gums and Alveoli treated by Operation ;” and Mr. Charles Tomes would read a paper on “The Modes of Attachment of the Teeth to the Jaws.”

The Society then adjourned.

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# ORDINARY MONTHLY MEETING,

*December 2nd, 1878.*

ALFRED COLEMAN, Esq., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting were read and confirmed.

The following gentlemen signed the Obligation Book, and were formally admitted to Membership by the President.

Messrs. J. C. FORAN,  
GEORGE HOCKLEY,  
JOSIAH WORSTER, and  
WILLIAM WEST.

The following gentlemen were then balloted for and unanimously elected :—

Mr. R. LIVINGSTONE MEARNS, D.D.S. (Philadelphia), of Ipswich, Queensland ; and

Mr. WALTER SAUNDERS, D.D.S. (Philadelphia), of Memel House, Ramsgate.

Messrs. FRANK HENRY and THOS. GADDES were elected auditors of the accounts for this year.

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Mr. CHRISTOPHER HEATH then read the following communication :—



*Two Cases of Hypertrophy of the Gums and Alveoli treated by Operation.* By CHRISTOPHER HEATH, F.R.C.S., Holme Professor of Clinical Surgery in University College, Surgeon to University College Hospital, and Consulting Surgeon to the Dental Hospital of London.

MR. PRESIDENT AND GENTLEMEN,

CASES of hypertrophy of the gums are not very common, but both Mr. Tomes and myself, in our respective works, have referred to most of the recorded cases, the most remarkable being that of Mr. Mac Gillivray, of the Bendigo Hospital. I am able now to supplement my report of Mr. Erichsen's patient operated upon in 1867 when  $2\frac{1}{2}$  years old, from the *Medico-Chirurgical Transactions*, vol. 56, to which the late Dr. John Murray, of the Middlesex Hospital, contributed a paper "On three peculiar cases of *Molluscum fibrosum* in children of one family." The eldest of these was Mr. Erichsen's patient, now seven years of age, and she presented peculiarities of the skin, subcutaneous connective tissue, periosteum and ends of the fingers and toes to which I need not further refer, but will quote Dr. Murray's description of the oral cavity:—"The

appearance of the gums is very remarkable. They are everywhere greatly hypertrophied, and they almost completely bury the teeth. They form in parts numerous papillomatous or polypoid-looking growths, and in other situations present a peculiar fungating appearance, indeed this latter characteristic of the growth is at once observed. The teeth, although almost buried by the hypertrophied gum, are still in every case visible, and are, in some measure, serviceable for the purposes of mastication. The enlargement of the gums is most marked at their upper and free surface, where they are mostly flattened out and in parts hardened by the pressure of the opposing gum. They present the natural colour, and although they are in parts somewhat soft, vascular, and spongy-looking, they mostly feel firm and fibrous to the touch. It is alleged by the parents that they have a tendency to bleed, but there is no evidence of this in her present condition. The mucous membrane in the oral cavity is elsewhere in every respect normal, the disease being distinctly limited to the gums." A coloured portrait of the child is given, which I now show.

The patient's brother, aged four, had his gums affected similarly, but to a greater extent than his sister, the growth being first observed when he was three months old. Her sister, aged two, has a similar condition of the gums.

It is remarkable that in these children, as also in Mr. Alfred Canton's case (recorded by Mr. Tomes), and in the case of the child I am about to relate, there was a defective mental condition, but none presented such remarkable abnormalities unconnected with the mouth as the three in Dr. Murray's paper. In all the recorded cases the hypertrophy of the gums has been noticed quite early in life, and seems to have been general, affecting equally both jaws and the whole extent of the alveolar arch. My second case is a remarkable exception, however, the disease being confined to little more than one side of the lower jaw, and the patient being a well-grown and perfectly competent young man.

The following is the report taken from my Case-book at University College Hospital, where the patient was admitted on the kind recommendation of Mr. Coleman, your president:—

Under the care of Mr. Christopher Heath.  
Hypertrophy of gums; removal; cure.

Amy B., ætat.  $4\frac{1}{2}$  years, was admitted into University College Hospital, May 6th, 1878.

*Previous History.* — Patient is one of five children; the four are healthy, except the youngest, aged 6 months, who suffers from lichen. Two years ago the swelling of the gums began by the side of the temporary molars, which were just coming through, and from them the swelling



has spread right round the jaw. At this time she had fits about once a week; the fits have continued up to the present time, but with longer intervals. They appear to be epileptic.

*Present State.*—Patient is a very tractable child; her general health appears to be good. The gums are enormously hypertrophied, the teeth being entirely covered, with the exception of the tips of the crowns, which appear depressed in the gums. The hypertrophy of the gums is so great that the cheeks are bulged out on each side, and the cavity of the mouth is almost filled with them.

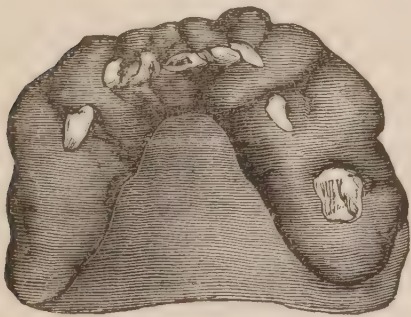


Fig. 1.—Lower Jaw of Amy B.



Fig. 2.—Upper Jaw of Amy B.

The teeth are irregular and slightly carious. The child is always biting and putting cold things in her mouth. She can bite nothing hard, and has been fed entirely on liquid or pulpy food. Her breath is very offensive.

May 6th.—Mr. Ibbetson took casts of the gums in india-rubber.

May 9th.—Patient being under chloroform, Mr. Heath removed the hypertrophied gums and

the alveolar margin of the lower jaw in two pieces with the elbowed bone-forceps. On one side the first permanent molar came away; on the other it was left, not being quite erupted. Hæmorrhage, which was free, was stopped with the actual cautery.

May 20th.—The lower jaw is covered with a layer of thin slough.

May 23rd.—Patient being under chloroform, Mr. Heath detached the hypertrophied gums and alveolar border of the upper jaw in one semi-circular piece. Roots of the permanent teeth left.

May 29th.—Wound almost healed.

June 3rd.—Discharged well.

The second patient was recommended to me by my colleague, Mr. Ibbetson, to whom I am indebted for the model I show.

Mr. L., æt. 26, came under my care in June, 1877, with hypertrophy of the gum and alveolus of the right side of the lower jaw, extending from the right wisdom-tooth to the left canine. The affection had been noticed from early childhood, and gives no pain, but produces slight deformity, giving the patient the appearance of having his mouth full, and making him talk thickly. The two photographs and the model show the condition well.

On June 19th, the patient being under chloroform, I removed the affected alveolus with Liston's

powerful cross-cutting forceps, instruments which I have found particularly serviceable in the treatment of epulis. The wisdom-tooth was left, but the other teeth were necessarily sacrificed up to

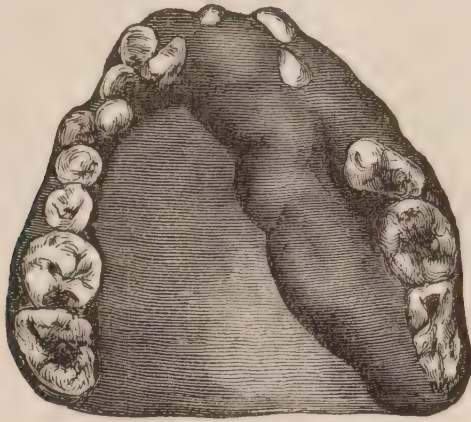


Fig. 3.—Lower Jaw of Mr. L.

the left canine. The hæmorrhage was free, but was controlled with the actual cautery freely applied, and the patient made a good recovery in a fortnight. Mr. Ibbetson subsequently fitted some artificial teeth; the patient is now in much greater comfort than before.

The preparation is shown, and a section has been made to show the fibrous structure of the growth, which is an example of pure hypertrophy.

In conclusion, I would say that nothing less than complete removal of the affected alveolus seems to offer any hope of alleviating these cases. Mr. Erichsem in 1867 thoroughly pared off the exuberant growth of the girl Ellen S., but in 1872 there was complete reproduction of the



## 24 HYPERTROPHY OF THE GUMS AND ALVEOLI, ETC.

disease, as may be seen in the lithograph. In the child operated upon by me, the condition of the gums was such as mechanically to interfere with taking food, so that there was no hesitation in sacrificing the temporary teeth ; and it may be hoped that many of the permanent teeth escaped injury, and may be erupted in due course.

## DISCUSSION.

Mr. IBBETSON showed models, recently taken, of the case operated on by Mr. Heath in June, 1877. The operation had been quite successful, and the patient was much pleased. Three teeth remained on the left side, and only the last molar on the right, which, however, was useful as a *point d'appui* in fitting the new set.

Mr. CHARLES TOMES said that the microscopic structure of the growth described by Mr. Heath closely resembled that of the small polypi which were sometimes found occupying the cavity of carious teeth: it was a true hypertrophy of the gum, and chiefly of the fibrous portion. It sprang from the periosteum round the neck of the teeth, just within the margin of the alveoli. From this point a dense stroma of interlacing fibres, covered by a thin mucous and epithelial layer, grew up round the tooth, the growths from opposite sides meeting over it and coalescing, so as almost to cover it. The chief point to be remembered was the attachment within the socket, for this explained how it was that a successful result could not be obtained without removing part of the alveolus. Unless this was done, the base of the growth was left behind, and recurrence soon took place.

Mr. WOODHOUSE said he remembered to have read in the "Cosmos," about two years ago, notes of two cases of epulis treated in a novel manner. The writer made an opening in the epulis, and inserted a small quantity of arsenious acid; this caused the growth to slough away with the small portion of alveolus to which it was attached. In these cases the tumours were of the ordinary circumscribed form; but he thought that by dealing with a portion at the time the same treatment might be successfully applied to the more extensive

outgrowths described by Mr. Heath. He should be glad to know if it had ever been tried.

Mr. SEWILL said they had heard very satisfactory accounts of the treatment of this disease from Mr. Heath, and of the pathological anatomy from Mr. Tomes. It was much to be desired that similar light should be thrown on its etiology; at present this was very obscure. Cases of hypertrophy of the gums of a less extensive character than that just described were not unfrequently met with in hospital practice. The hypertrophy was always due to dental irritation. Inflammation and swelling took place round a diseased tooth; the inflammation subsided, but the swelling only partially, and after several attacks, localized hypertrophy resulted. This was most common in scrofulous subjects. Mr. Braine had exhibited before the Medical Society of London, a short time since, a case of hypertrophy of the gums, and of the mucous membrane of the lips. That patient was evidently scrofulous, having considerable enlargement of the cervical glands. He would ask Mr. Heath whether his patients showed any decided evidence of struma?

Mr. CHARLES TOMES remarked that Julia Pastrana, the celebrated "Pig-faced Woman," had marked hypertrophy of the gums.

Mr. WEISS said that, having had an opportunity of examining the mouth of that extraordinary being, and having taken models of it, which were now in the Society's museum, he could confirm Mr. Tomes' statement; at the same time that was not a case of hypertrophy simply, for the dentition was also irregular. She had several supernumerary teeth.

Mr. HUTCHINSON said he had lately met with a very well-marked example of localized hypertrophy of the gum affecting the palatine surface of the tuberosity of the superior maxilla, and extending from the second molar to the wisdom-tooth; the latter was carious, and this was probably the cause of the



growth. The gum appeared quite healthy, not in the least tender or inflamed. He had sent the patient to Mr. Heath at University College Hospital for inspection. With regard to the treatment of the general hypertrophy, Mr. Tomes had said that it resembled in structure the small polypi which sprang up near a carious tooth. Now the treatment in such a case was to extract the tooth. Simple excision of the diseased tissue did no lasting good, whilst the operation performed by Mr. Heath seemed to him somewhat severe. Might it not be worth while to try the effect of removing the teeth? He wished to ask one more question. On looking at the preparation sent round, it appeared that several of the teeth had been cut through. Would it not be better to make the incision a little lower? or might not the portions of fang, unless extracted at the time, prove afterwards a source of irritation?

The PRESIDENT remarked that hypertrophy of the gums was often due to carious teeth. There were several models in the museum which showed this well; but the enlargement was not so general as in Mr. Heath's cases. One of the best examples of this he had ever met with was a case he had seen with the late Mr. Campbell De Morgan. The patient had hypertrophic enlargement affecting the whole of one side of the jaw. Three back teeth which were loose were first removed, and the hypertrophy in their neighbourhood subsided; then the front teeth were extracted, and the rest of the overgrowth disappeared. In Mr. Heath's cases the extent of the disease, and the tender age of some of the patients, rendered it necessary to look for some other cause than dental irritation.

Mr. HEATH said that although some of the teeth had been cut through in the course of the operation, it was most probable that the small portions of fang left behind had been thrown off in the process of healing; certainly they had given no further trouble. With regard to Mr. Hutchinson's suggested treatment, he should have no objection to try it; for if it failed, a section of gum could be removed afterwards; but

he had not much hope that it would be successful, and he thought that it would really put the patient to less pain and inconvenience to do as he had done—perform both operations at the same time. He might mention that it was Mr. Salter who had impressed upon him the necessity for removing part of the alveoli. As to the cause, he could say nothing. It was curious that there should have been three examples of the disease in one family, and that in them and in Mr. Coleman's case there should have been also a deficiency of intellect. The disease of the fingers, &c., associated with the hypertrophy in Dr. Murray's cases, certainly pointed to a scrofulous taint in those patients, but he could not say that this was always present.

The PRESIDENT then called upon Mr. Charles Tomes to read his paper.

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*On the Attachment of Teeth.*—Part III. *On Hinged Teeth.* By CHARLES S. TOMES, M.A., F.R.S.

IN two previous papers ("Trans. Odont. Soc.," vol. vii. p. 41, and vol. viii. p. 191) the attachment of teeth by membrane, by ankylosis, and by implantation in a socket, has been briefly described; but, at the time at which the papers referred to were written, I had not the material at hand to enable me to notice one of the most interesting forms of attachment,—that by means of a flexible hinge.

It has long been known that the Angler (*Lophius piscatorius*) had teeth which were movable; but this peculiarity was supposed to be confined to this genus, and it is only in very recent years that two or three other fishes have been added to the list of creatures with teeth mounted upon flexible hinges.

My own investigations, however, lead me to infer that it is highly probable that many other examples of hinged teeth may be found, and that they have been overlooked simply because they have never been searched for. I need give no further ground for this belief than that I have



found them in a hitherto unsuspected place—in the mouth of so familiar a fish as the common pike.

Hinged teeth have all this much in common—they are capable of being bent down by the application of a moderate force, in many cases at right angles with their erect position, and on removal of the pressure they at once rebound to the upright position.

This bending down takes place always towards the throat; so that no obstacle is placed in the way of food passing towards the gullet, but its return is opposed by the recurved teeth, rigidly fixed against any bending in the outward direction.

But whilst all described hinged teeth have certain characters in common, they have also great and well-marked differences in the manner in which the required mechanism is constructed. Nothing with which I am acquainted illustrates better the law, that nature desirous of producing a new form of organ does not introduce some new thing altogether, but modifies and develops that which is already at hand, till an organ answering the required purpose is arrived at.

Without entering into zoological questions here, it may be simply mentioned that the Angler, all fish of the Cod tribe, and the Pike, are fish belonging families sufficiently remote from each other; yet

in these three families hinged teeth are found, and in each, though the result is pretty much the same, the mechanism by which it is got is different.

The Angler is a fish which is extraordinarily ugly. It is almost all head and mouth, its body bearing but a small proportion to these. It feeds upon other fish, which it catches by lurking in the mud (which it resembles in colour) and springing out upon anything which happens to come within reach. Its prey, when caught, is swallowed whole and alive.

Round the margins of its capacious jaws are ranged two rows of teeth. The outer and shorter row are recurved and sharp, and rigidly ankylosed to the bone. The inner row are very much longer, and so stand upon the jaw as to be much higher; they also are sharp and recurved, but they are attached by a flexible hinge, which allows of their being bent inwards towards the mouth, and by its own elasticity causes them to resume the upright position; that is to say, all else except the hinge being severed, the tooth retains its elasticity. Each tooth is perched upon its own little pedestal of "bone of attachment,"\* which, in accordance with that law which holds

\* By "bone of attachment" is meant that portion of new bone specially developed for the fixation of a particular tooth, whether it be ankylosed, socketed, or hinged.

good equally in the case of anchylosed, socketed, or hinged teeth, is developed, not in any pre-ordained spot, but just where the tooth happens

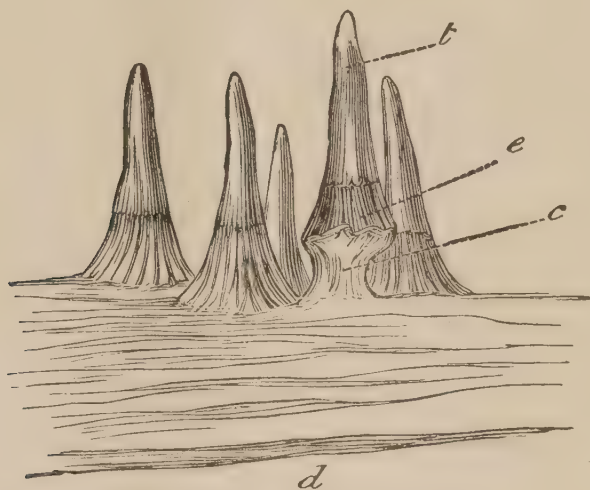


Fig. 1.—Hinged Teeth of *Lophius piscatorius*, seen from the inner side: the tooth *t*, crowded out of line, is attached by its ligament *e* to a special little pedestal of “bone of attachment,” *c*.

to get to. This is excellently illustrated by the specimen figured, in which one tooth that has been crowded out of its position in line has its little pedestal built up to it, just as a canine or bicuspid crowded out of line in a human mouth has its socket built around it.

A couple of years ago, whilst working at the development and the structure of Vaso-dentine, I stumbled upon another most beautiful example of a hinged tooth, up to that time, so far as I can learn, undescribed.

The Hake, a large predatory fish of pike-like aspect, belongs to the Cod family. It is very com-



monly caught in herring nets, as it follows and feeds upon herring shoals. The herring being an active fish, any contrivance facilitating its ingress into, and hindering its egress from, the mouth of its pursuer would be of obvious service to the

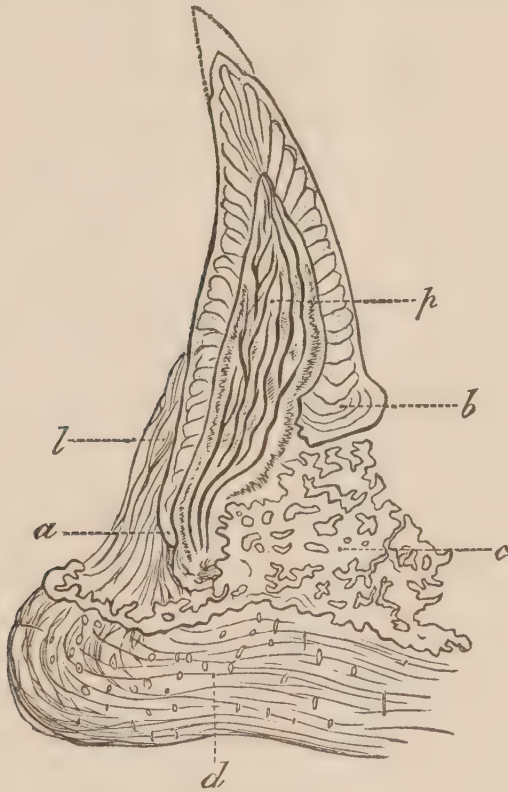


Fig. 2.—Hinged Tooth of Hake (*Merlucius*).

*p*, Pulp.

*b*, Thickened edge of base of tooth.

*c*, Buttress formed of "bone of attachment."

*l*, Ligament.

*a*, Thin edge of base of tooth to which the ligament is attached.

latter; accordingly we find that the margins of the Hake's jaws are armed somewhat like those of the *Lophius*, that is, there is an external low

row of fixed anchylosed teeth, and an internal higher-standing row of hinged teeth, which are individually much longer.

The mechanism of these hinged teeth is very interesting in its complete perfection of adaptation to its purpose. The tooth is a hollow cone of vaso-dentine, with a spear-point of enamel. On the one side the base of the cone is a thin edge of dentine, which descends much below the level of the other side of the base. This latter, in the place of a thin edge, terminates in a very much thickened flat surface. The ligamentous hinge is attached to the thin edge (*a*), and the outer surface above it. The thick flattened surface of the opposite side (*b*) is free, and is received upon a buttress of bone (*c*). The bone of attachment (*c*) is thin beneath the ligament (*e*), but rises up into a stout, flat-topped buttress, on which rests the thickened base of the other side of the tooth. When the tooth is bent down, the base (*b*) becomes separated by a considerable interval from the bone (*c*); but when the tooth springs up again, it returns, and the shock of its return is provided for by the strengthening both of the edge of the base of the tooth and of the subjacent bone. The mechanical advantage gained by the difference of level between the two sides is obvious: clearly the tooth figured cannot be bent towards the right without tearing through, or greatly stretching, the ligament, and

this to a far greater extent than if the two sides had been upon the same level.

The pulps of these teeth are richly vascular, and had the vessels, as in most teeth, come up from below, they would have been stretched or torn when the tooth was bent down. This difficulty is met by the vessels entering at the axis of motion, *i.e.*, coming in through a perforation in the ligament.

The ligament is the sole attachment of the tooth, and in it resides the elasticity which brings about the return of the tooth to the upright position.

I will now pass to a third class of hinged teeth, which I was fortunate to light upon also whilst engaged in investigating another matter. These are the palatal teeth of the common pike. Round the margin of a pike's lower jaw stand a row of teeth, many of them very large, which are familiar microscopic objects. They are solid (at least, have no large axial pulp-chamber) and are rigidly ankylosed to the bone. Their microscopical structure has been well and minutely described by Retzius. They consist of the tissue ordinarily known as Vaso-dentine, but which I prefer to designate as Osteo-dentine.\* But it does not seem to have occurred to any one to look at the palatine teeth, which are far more interesting.

\* On the Structure and Development of Vascular Dentine ("Philos. Trans. Royal Society," 1878).



These stand in three roughly parallel bands—a central row on the vomer, lateral ones on the palatine bones. A great number of teeth are found in each band, the largest being near the front.

A pike makes a dart upon its prey; if it is small, at once engulfing it in its mouth; if it is large, seizing it crossways with the great piercing teeth which arm his lower jaw. Thus maimed, and less able to escape, it is transferred to his mouth, whence it is swallowed whole. But in order to be swallowed at all, it must be carried end on into the gullet, and it is for the arrangement of the fish to be swallowed along the median line of the mouth that the pike uses his hinged palatal teeth.

The teeth of the middle band all bend backwards, and cannot be bent in any other direction; but those on the edges of the band bend backwards, and a very little outwards.

The teeth of the lateral bands bend obliquely inwards and backwards, and between the median and lateral bands is a considerable interval in which are no teeth.

The pike having taken its prey alive and struggling into its mouth, shuts the mouth, and presses it with the tongue up against the palate. So long as the fish is keeping in the middle line of the mouth, and moving backwards towards the pha-

rynix, the sharp recurved teeth on the palate give way, and lie down to allow it to pass over them ; but every movement forwards is instantly checked by the recurved teeth, rigidly fixed against flexion in that direction ; while the lateral teeth are no obstacle to the backward passage of the fish, but resist any tendency to its leaving the middle line. Thus the very struggles of the prey are utilized when they tend to carry it lengthwise back to the throat of the pike, and prevented when they tend otherwise.

So much for their general purpose. Their minute structure is hardly less interesting.

Like all hinged teeth, they are attached by one side of the base only by means of a ligament, the other side being free ; but in this ligament there resides no elasticity at all.

To return for a moment to the solid anchylosed tooth of a pike. In its development a thin external crust is formed. At this period it is a hollow cone with soft contents, but from the interior of this cone there shoot down many calcifying rods which interlace and obliterate the pulp-cavity, and proceeding downwards to the bone, with which they become fused, anchylose the tooth to it.\*

\* In Osteo-dentine the calcification does not take place in an odontoblast layer, but by trabeculæ shooting through the whole pulp ; hence in the completed tooth there is nothing which can justly be called a pulp-cavity. A more complete

The hinged tooth up to a certain point is developed in a manner precisely similar; only a hinge of ligament is formed at one side of its base, and in place of the many rods of calcifying tissue which shoot down through and through its pulp-cavity,

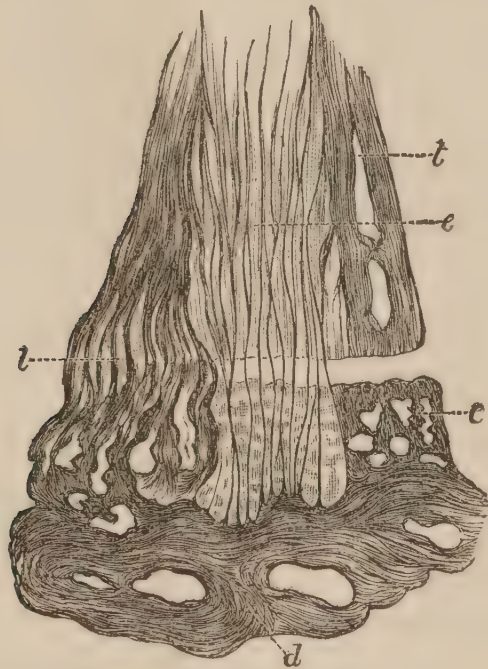


Fig. 3.—Hinged Palatine Tooth of Pike.

c, Bone of attachment.

d, Bone of jaw.

e, Partially calcified Trabeculae shooting down to subjacent bone.

l, Ligament.

t, Outer shell of dentine.

reaching the subjacent bone, fusing with it, and calcifying, and so fixing down the tooth, they

account of the development of Osteo-dentine will be found in the *Philosophical Transactions of the Royal Society*, 1878, and of that of the Pike in the *Quarterly Journal of Microscopical Science*, 1878.



stop short of full calcification, so that they are calcified up above in the tooth, but soft in their lower portions where they reach down to the bone. They are highly elastic, so that we have a hinged tooth fixed by an inelastic hinge, attached also by a number of elastic strings in its interior. Such is the elasticity of these strings, that the larger teeth, when bent down and suddenly released, return with an audible snap.

Much might be written and said upon the lessons to be learned from the study of these teeth: it will suffice to point out the most obvious and perhaps the most important.

Hinged teeth are highly specialized organs, modified to fulfil a very definite object. They are to be found in at all events three different fishes in no near way related to one another. In each of the three the same object, and, roughly speaking, the same result, is attained: in each of the three the mechanism is different. Thus, in two the hinge itself is elastic, in the third the elasticity resides in the aborted rods of bone, &c.

Thus natural selection has worked upon the teeth of the ancestors of these fish, and modifying them as little as may be, so that each retains the traces of its parentage, at the same time has made them to answer to new requirements.

Of the gradual genesis of the hinged teeth of the Angler and the Pike I can tell you nothing,

but the Cod family, as at present surviving, furnishes us with almost all the links in the chain of manufacture of the Hake's tooth.

For, without entering into details which I have described elsewhere, in the Cod family there are fish whose teeth have no mobility, but yet are not fixed by bony ankylosis; fish whose teeth have a small range of motion, this being in one direction only (*e.g.* those of the common cod), and, finally, teeth like those of a hake, which will move through an angle of 70 degrees with facility.

I owe the Society an apology for reading before it a paper almost wholly composed of things which I have described previously elsewhere; the descriptions, however, brief as they are, of the different varieties of hinged teeth, have not before been brought together in a collected form, but occur in papers principally describing other things. Moreover, as the accounts are scattered in different pages in different periodicals, all of which may not get into the hands of the members of the Society, some of your officers have assured me that this avowed *rechauffé* will be accepted at your hands.

*Addendum.*

ALTHOUGH not relevant to the foregoing paper, a form of socketed attachment with which I have lately met is so interesting that I append a brief description of it.

The fish in which it is met with is the *Sargus ovis*, or Sheep's-head Fish, eaten largely as a delicacy in America at certain times of the year.

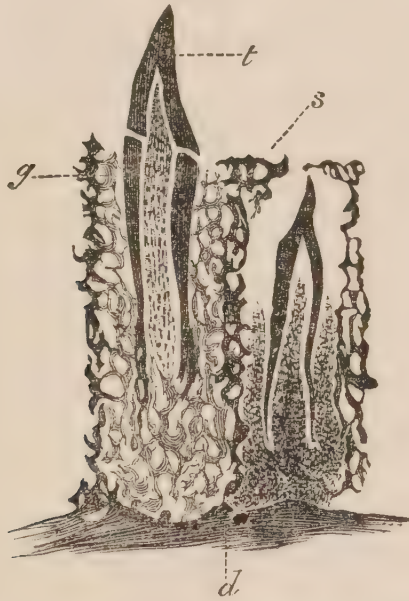


Fig. 4.—Section of Jaw of *Sargus ovis*, showing one fully erupted socketed tooth, and another as yet not fully developed.

*d*, General surface of jaw.

*g*, Scaffolding of porous bone which holds it in place.

*s*, Stouter bone which forms the sockets.

*t*, Crown of tooth, exposed above the gum.

The teeth have many other peculiarities, but the only one which need be here noticed is its manner of fixation. When the formative pulp



has completed that portion of the tooth which is to be above the gum, a curious check occurs in its further development, which results in feeble union between the crown and root, so that in rubbing down a section it often comes in two at this point: this is indicated by a white line in the figure.

Then the formation of dentine is resumed (with a difference in structure) and a root is formed, which does not taper down to a point, but terminates with a widely-open end; at least widely open so far as the dentine of the root is concerned, though it is really ultimately blocked by a loose imperfect bone.

Instead of this root being attached to a bony socket by the intervention of a soft alveolo-dentar periosteum, it is held in place by a loose scaffolding of cancellous bone, which, taking the place of a periosteum, holds it to a socket of much denser stronger bone (*s*).

This fabric of bony meshes is derived from the calcification of the same structures as would ordinarily go to form the alveolo-dentar periosteum; it is, in fact, that which has never been met with in a mammal, a tooth ankylosed to its socket by ossification of its periosteum; and herein mainly lies its peculiar interest.

## DISCUSSION.

Mr. MUMMERY said that what struck him as most interesting in Mr. Tomes's description was the exact correlation of the structure of the teeth with the habits of the fish. Thus, in the case of the Cod family, the Hake lived chiefly on herrings, an active and migrating fish; whilst the other species were less particular in their diet, and took whatever came to hand. In the Hake, accordingly, the means for catching and holding its prey were more highly developed than in the Cod and Haddock. He might mention, as showing the extent to which fish preyed upon one another, that on one occasion, on opening a cod, he found a haddock, in the haddock were two whittings, and in the whiting the remains of some other fish; but these were so far gone in the process of digestion that he could not carry his investigations any further.

Mr. GADDES asked whether Mr. Tomes could throw any additional light upon the structure of the hinge of the Pike's tooth? So far as he had understood, the tissue was not really elastic, did not contain any proper elastic fibres.

Mr. STORER BENNETT asked whether the bony scaffolding surrounding the teeth of the Sheep's-head fish, which had been spoken of by Mr. Tomes as "calcified periosteum," was at any period of the animal's life demonstrable as ordinary periosteum?

Mr. HUTCHINSON asked whether the elastic membrane at the base of the Pike's tooth was surrounded by osteoblasts or by odontoblasts? Were the fibres developed from odontoblasts, like dentine, or from osteoblasts, like bone?

The PRESIDENT remarked on the exceedingly clear and lucid manner in which Mr. Tomes had described these complicated

arrangements. He gathered that, in all the examples given, the action of the hinge was simply mechanical ; that there were no muscles attached by which voluntary control could be exercised.

Mr. TOMES replied that he had not been able to discover any true elastic fibres among the rods which form the elastic base of the Pike's tooth. This elastic tissue was developed from osteoblasts, as, indeed, was nine-tenths of the tooth, which had only a small cap of dentine. As to the bony scaffolding surrounding the base of the teeth of the Sheep's-head fish, it never was demonstrable as periosteum, but it and the mammalian alveolo-dental membrane were homologous, being both developed in the same way, and from similar organs.

After the usual vote of thanks, the meeting adjourned.

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# ANNUAL GENERAL MEETING,

*January 13th, 1879.*

ALFRED COLEMAN, Esq., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting having been read and confirmed,

THE PRESIDENT announced that the following gentlemen had been nominated for election as members :—

WILLIAM EDWARD MARGETSON, M.R.C.S., L.D.S. Eng.,  
Roscoe House, Dewsbury, Non-resident.

GEORGE HENRY CROWTHER, 1, Bond-street, Wakefield,  
Non-resident.

JOSEPH JOHN HUXTABLE SANDERS, 72, High-street, Bangor,  
North Wales, Non-resident.

THOMAS BALCOMB, 56, Pembroke Terrace, St. Heliers,  
Jersey, Non-resident.

WILSON HOGUE, D.M.D., Harvard, U.S.A., Bournemouth,  
Non-resident.

W. HERBERT WOODRUFF, L.D.S. Eng., Leamington, Non-  
resident.

ARTHUR SWAYNE UNDERWOOD, M.R.C.S., L.D.S. Eng.,  
11, Bedford Square, Resident.

EDWARD PERCY MAY, M.R.C.S. Eng., 46, Euston Square,  
Resident.

EWEN MUNTEICH TOD, L.D.S., Eng., 9, Old Steine,  
Brighton, Non-resident.

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Mr. HENRY exhibited models of the upper and lower jaws of  
a young gentleman, aged 17, which presented the following

peculiarities. In the lower jaw all the primary teeth were present, and there were no signs whatever of any of the permanent set. In the upper jaw the only permanent teeth which had appeared were the central incisors and the bicuspid. As there had been a considerable gap on each side between the primary canines and the first bicuspid, Mr. Henry had removed the former, and substituted a pair of artificial canines. The crowns of the lower incisors were worn almost level with the gum.

Dr. FIELD showed an improved Morison's engine, which he had purchased during a recent visit to the United States, and which he believed to be the only one of that pattern as yet introduced into England. The chief advantage which it possessed over other machines of the same kind consisted in the short and very flexible arm, which could be made to work at angles, which could not be managed with any other machine.

The arm was exactly balanced by a spring, so that there was no weight on the hand of the operator; the coned journal-bearings made the machine surprisingly light and easy to work.

The PRESIDENT said he should like to see White's machine simplified by doing away with the outside sheath of the arm, and substituting a rotating wire cord. The machine could then be worked at almost any angle, which, as Dr. Field had stated, was not possible at present.

Mr. JAMES PARKINSON showed a curious extracting instrument which his brother, Mr. George Parkinson of Bath, had found among the effects of a deceased surgeon, and which he had sent for presentation to the Museum.

Mr. OAKLEY COLES exhibited (for the inventor) specimens of Mr. Hempel's new springs and swivels.

The PRESIDENT thought the invention would prove a valuable contribution to mechanical dentistry. It was a very common occurrence for patients to break or bend their springs; by means of the arrangement Mr. Coles had just described, they could be replaced or adjusted with much less trouble than formerly. Mr. Rogers years ago introduced a very similar plan of swivel.

Mr. HUTCHINSON bore witness to the value of the invention, and mentioned the case of a lady who had worn a pair of very light springs, attached according to Mr. Rogers' plan, for thirteen years without accident.

Mr. McCLEOD showed a new mouthpiece for a saliva-ejector, which had been invented by Dr. Orphoot, of Edinburgh. It consisted of two parts : the first, which was designed to remove the sublingual secretion, consisted of a German-silver tube bent into an ogee form. To the upper end of this a bright metal disc could be attached, which served as a tongue-guard and also as a reflector, to throw light into a distal cavity. To the lower part of the tube another tube, made of block-tin, was soldered, and to this the saliva-pump was attached. Block-tin was chosen, because it could be readily bent without risk of breaking or cracking ; and in the case of stout patients it was often necessary to bend the tube outwards. The second part of the apparatus was intended to remove the parotid secretion : it consisted of a perforated tube of indiarubber about four inches long, which was tucked up under the upper lip and into each cheek. To one end of this a tin tube was attached, which descended to the saliva-pump from the side of the mouth opposite to that on which the operator was at work. The two tubes were secured by an adjustable clamp placed somewhere below the chin of the patient. The apparatus could be fitted to any of the saliva-ejectors at present in use.

Dr. FIELD, after making a personal trial of the invention, said he considered the sublingual mouthpiece the best he had ever seen, but he doubted whether the parotid tube would be of much practical use. A pad of paper placed over the orifice of the duct answered every purpose, and was less irksome to the patient.

Mr. HUTCHINSON also expressed his approval of Dr. Orphoot's mouthpiece, but called attention to the necessity for very careful soldering at the junction of the silver and tin tubes ; a small orifice in that situation would render useless the whole apparatus. He agreed with Dr. Field in thinking the parotid tube unnecessary. A pad of amadou was the best thing for



closing Steno's duct: with this he was able to arrest all secretion for from  $1\frac{1}{2}$  to 2 hours.

Mr. MAY showed a model of the upper jaw of a patient, one of whose central incisors had been driven up into the inferior meatus by a fall.

The PRESIDENT then read a communication from Mr. Fletcher, of Warrington, respecting a new filling with which he had lately been experimenting. It was a hard, white substance, composed of silicate of lime and alumina, slightly translucent, and was altogether the most perfect imitation of enamel he had ever seen. With the view of showing its chemical stability, Mr. Fletcher had submitted it to the following tests. He had filled four teeth and had immediately, within five minutes, placed one of each in the following solutions; viz., strong hydrochloric acid, strong liquor ammoniæ, a nearly saturated solution of citric acid and vinegar. They were allowed to remain in the solution, suspended near the top, until partial or total destruction of the tooth enamel had occurred. Mr. Fletcher claimed that "no other white filling known would stand any tests approaching these in severity: they will withstand one or two of the solutions, but not all of them; the liquor ammoniæ especially is rapidly destructive of all white fillings. His material would withstand all, except the strong hydrochloric acid. The other teeth, after remaining in their solutions for from fourteen to twenty-four hours, showed only slight disintegration of the surface of the stopping, to about the same depth as the tooth enamel had been affected. The plugs had all been put into cavities with the weak edges left, and without being excavated: the material was merely pressed in with the finger and smoothed off with a penknife, and the surface was not burnished or condensed in any way. It was exceedingly nice to work, and was to a certain extent translucent, and had not the dead opaqueness of other white fillings." Mr. Fletcher had sent him the four teeth referred to above, and he would hand them round for inspection.

The PRESIDENT then called upon Mr. Rogers for his Report as Librarian.

Mr. ROGERS said he was glad to be able to report that the library was in a very satisfactory condition. The books were in a good state of preservation and were steadily increasing in numbers. The only volumes missing were Garretson's *Oral Surgery*, and Heath's *Diseases and Injuries of the Jaws* (Second Edition); and as these had been missing for three years, he feared they were hopelessly lost.

He had one unsatisfactory fact to report, and that was, that the number of books borrowed had fallen to one-half of the usual number : only fifty volumes had been taken out during the year. He was obliged to add that this falling off was chiefly due to the fact that, owing partly to press of other work and partly to ill-health, he had not been able to attend to his duties as librarian as regularly as he should have done. He had on a previous occasion tendered his resignation to the Council, assigning these very reasons, but he had been requested to hold the office a little longer. Now, however, the bad effects of his remissness had become so evident, that he had felt bound to renew his application to the Council, and had prevailed upon them to accept it. He felt sure that his successor, Mr. Weiss, from his well-known literary tastes, would do all he could to restore the library to its former state of usefulness. He might state that since he had been librarian the number of books had increased from 568 to 840, an increase of 50 per cent., and, of course, the labour of looking after them had increased also. In order to make the library and museum as readily available for study and reference as they should be, it would be absolutely necessary to appoint a paid official, who should combine the duties of sub-librarian and sub-curator. He feared that the funds of the society were not yet in a state to justify the outlay which this step would entail, but he had hopes that before long a Library Endowment Fund might be started with the view of carrying out the suggestion he had made. The facilities which the post would afford, with the library and museum at command, for the carrying out of original investigations, would, he felt sure, make it acceptable to good men, even at a very moderate stipend.

The PRESIDENT said he felt sure members would hear with

regret that Mr. Rogers had felt compelled to resign the office of librarian. In his report he had omitted to state that he had presented a copy of Kölliker's *Manual* to replace one which had been lost.

With regard to the Museum, Mr. Charles Tomes stated that he had brought all the new specimens under the notice of the Society from time to time, and he had no special report to make.

The PRESIDENT then called upon the Treasurer, Mr. James Parkinson, to read his Report, which will be found appended to the present number of the Transactions (see p. 61).

Six members having been proposed in the usual way, the President selected Messrs. Stocken and R. Woodhouse to act as scrutators of the balloting-lists.

The PRESIDENT then proceeded to deliver his valedictory address :—



## PRESIDENT'S ADDRESS.

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GENTLEMEN,—The hour has now arrived when I must restore to your hands the important trust you confided to me a year ago. When I assumed the highly honourable office of the Presidency of this Society, I admitted the great probability of my own short-comings, but the certainty of the compensating ability of my colleagues. In both prognostications I have been only too correct, and therefore, if our Society has made a fair progress during the past year, all credit for the same must be attributed to the latter. That it has done so I am encouraged to believe, as in the number of our Members we can happily show an increase over any preceding year, whilst under the fostering care of our able Treasurer our finances are in a condition truly enviable in such times as the present.

Our ordinary monthly gatherings, which we must ever regard as the mainspring of the Society, have shown during the past year an excellent attendance, and the discussions on papers and questions raised have certainly been equal, if not surpassing in interest, to any in former years.

Our first meeting was occupied in the discussion

of casual communications and in a short address from myself upon assuming the office of President. At the second, our March meeting, we were favoured with a paper by Mr. C. S. Tomes "On some forms of Dentine Calcification, with notes on their bearing on dental pathology," a paper expressing in the clearest terms our present knowledge of the various forms of dentine, and suggestive of certain pathological conditions that may be explained by an insight into their various modes of development. Personally, I am much indebted to Mr. Tomes for having at a short notice produced his paper to supply a hiatus. The April meeting was of a somewhat novel and experimental character, being the discussion of a mooted point in relation to the treatment of dental irregularities,—viz. "Extraction *versus* Expansion of the Dental Arch." Both views of the subject were ably treated in the discussion; and although no definite conclusions were arrived at, it was a meeting that could not have been other than instructive and practically useful, especially to junior members.

In May we were favoured with a paper from Mr. Hildich Harding, "On the Absorption in Bone and Tooth-structure," and which, from the research and care it exhibited, augurs well for another scientific worker amongst our ranks.

The June meeting was a repetition of the successful experiment of the April one: the subject

introduced was "The Nature and Treatment of the so-called Rigg's Disease"; the line for discussion was suggested in a series of questions submitted by Mr. C. S. Tomes, who unfortunately was unable to be present. The meeting was also favoured by a letter on the subject from Dr. Arkövy, of Buda Pest, and the discussion opened by a short paper from Mr. O. Coles. The subject being extensive and at present not very clearly defined, it could by no means be exhausted in the allotted time, and there was a generally expressed wish that it might be again introduced at some future time. I trust such may be the case, as the matter is a very important one; and likewise for the reason that at the meeting in question more than one disease or condition was evidently referred to. Attention having been so prominently drawn to the subject, it is to be hoped more definite knowledge will be attained regarding its true nature and cause.

During the month of May in last year a youth died from the effects of chloroform administered for the extraction of two or three teeth. The editor of the *British Medical Journal*, in commenting on the case, remarked: "Is it ever right to use chloroform for dental purposes? We wish the Odontological Society would pronounce an authoritative opinion on that subject; and we should hope that, if they were to do so, they would absolutely forbid it." As President of the Society



referred to, I felt we could do no other than accept the suggested duty, provided our responsibility could be shared by the presence and opinion of those most eminent as anæsthetists in this city. The question was, as you will remember, fairly and deliberately discussed at our November meeting, and whilst it was considered unadvisable to lay down any hard-and-fast rule, the general tenor of those who discussed the point was to the effect, that whilst chloroform should only be employed in very exceptional cases in Dental Surgery, there were still a few such in which it was the most suitable anæsthetic.

The authoritative character of this meeting rendered its conclusions most important: whilst the assertion remained unchallenged, the position of any one who recommended chloroform for a dental operation was far from satisfactory, whilst now he may feel, under peculiar conditions, justified in so doing.

I think our time was well expended on that occasion in arriving at a conclusion upon that one question only. Other questions bearing on the same subject had been suggested, and would have been discussed had time permitted; they were, however, of minor importance, and were, moreover, some of them so thoroughly forensic that the Society could only have expressed a very qualified opinion upon them. At our last, the December meeting, we were favoured by a paper from Mr. C. Heath in

regard to those rare but interesting cases of hypertrophy of the gums; the histological characters of one case being given by Mr. C. S. Tomes, and which bore practically upon their successful treatment: the latter gentleman also again contributed a fourth communication,—“On the Attachment of Teeth,—Hinged Teeth.” That our Society is most deeply indebted to this gentleman we shall all admit: his communications, whilst so eminently scientific in character, are yet produced with such admirable clearness and precision that subjects in most hands difficult and dry become in his simple and interesting. That he should this year have received the highest scientific distinction our country can afford, has been a source of gratification I am sure to every member of this Society.

To-night's proceedings have not been without interest. We have been favoured with a variety of short communications of much importance, and our best thanks are due to the contributors. The communication from that most industrious of workers, Mr. Fletcher, holds out great hopes and expectations. It is true we have been somewhat disappointed in the results of former announcements; but I think, from private communications received from Mr. Fletcher, he is now on the right tack, and that ere long we may possess that great desideratum of our day, viz. a stopping as superior to gold as that was for some years regarded as superior to all other. In my opening address I

made what I believed would be considered as very heterodox remarks, at least on the other side of the Atlantic, *i.e.* should they travel so far, in regard to the precious metal; my surprise was therefore great when I read the severe condemnation of a high authority in that country. It however shows we are wanting something we do not yet possess, and it is to be hoped Mr. Fletcher, or some other worker, may produce the same.

Besides the papers and foregoing discussions, &c., the Society has been favoured with many cases of interest, description of new instruments and appliances, materials, &c., presented as casual communications, and which deserve much more than the mere notification of the fact which time now only permits.

At the April meeting I had the pleasure of announcing that a Committee had been appointed, supported by a grant from the Council, to enable it to obtain analyses and carry out experiments on new materials for filling teeth. It has made one report—at the June meeting—on Stayton's Amalgam (felt foil): the report simply contained an analysis of the compound. But I learn the Committee has been actively at work, and will ere long be able to present an account of their experiments with a variety of compounds. I greatly trust this Committee may be enabled to continue its work, although it is one which must trespass in no small degree upon the time



of its members. I am sure the Society will grudge them no reasonable sums of money, even if large, to enable them to prosecute such work. The profession have at present to rely wholly on the assertions of the vendors of the materials in regard to their value, if they desire to employ them early; on the other hand, a cautious refusal to use them until after years of trial, may some day prove a great misfortune to the cautious and their patients. The experiments of a former Committee made on the Zinc Oxy-Chlorides, though only chemical ones, were very encouraging, proving that which practically turned out correct; viz., that they could not be regarded as reliable and durable; and this as opposed to the views of some who from short experience formed a different view.

I believe the members will be pleased to learn that the Council has determined to supply them, from time to time, with portraits of their former Presidents by the Woodbury or some other similar process. I think this will be especially acceptable to country members, many of whom, from distance, &c., have little other benefit from the Society than the reflection that they are contributing to an excellent object.

This, gentlemen, is a short summary of the work of the Society during the past year, and it will, I trust, bear a favourable comparison with most of its predecessors. If we have had no great event

to chronicle, we have happily had no great calamity to deplore. That the ever-busy hand of death has spared our ranks during the past year is a cause for thankfulness. Without our Society, one has been called away who at one time occupied no unimportant position in the profession; his practice was very large and his work of undoubted excellence,—I refer to the late Mr. Lintott.

The great event of the year, however, has occurred without the Society. When I addressed you in February last, but eleven months ago, in alluding to the same, I said, “ I can hardly venture to believe that so important a measure as that now before Parliament will ere a year passes become the law of the land ”; yet such it is, and we now sit here for the first time members of a legally recognized profession. I believe a work of this character to be almost unprecedented in the annals of parliamentary history, and it tells of the indefatigable labour of the two individuals who really achieved it.

To ourselves, *i.e.* as members of the Odontological Society, there may be apparently no actual gain (although to many the exemption from juries, &c., must be no little relief); indeed some of us may feel a little discouraged at our registered associates; but in all such measures existing rights, even if such are little other than actual wrongs, must be respected. Let us not forget that progress of any kind, whether it be that of the individual, the

nation, the community, or even of the species, is ever accompanied by self-sacrifice, a universal law prevailing from the highest to the lowest, and to which we have no right to expect exemption ; rather, let us content ourselves by reflecting that we have joined in a work deserving the gratitude of future generations.

Gentlemen, in vacating this chair, I thank you for overlooking my many short-comings and for your kind support. The office falls into able and experienced hands, and I have the comfort of feeling that, whatever the Society may have suffered in the year 1878, it is sure to more than regain in the year 1879.

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At the conclusion of the Address, the scrutators reported that the list of officers proposed by the Council had been duly elected.

Mr. WOODHOUSE proposed a vote of thanks to Mr. Coleman for the very satisfactory and efficient manner in which he had performed the duties of President. The depreciatory remarks in which Mr. Coleman had indulged at the commencement of his Address were certainly quite uncalled for. The Society was much indebted to him for his services in previous years, as well as in that just past, and they could not allow him to leave the chair without expressing their sense of the obligation.

Mr. WALKER seconded the motion, and said that Mr. Coleman's name was almost as well known in the United States as in England.

The PRESIDENT, in returning thanks, said he had received more from the Society than he had been able to repay. He had been the first member formally admitted by the President after the first incorporation of the Society, and from that time until his health began to fail, he had never missed attendance at a meeting. The Society was his school in those days, and a very valuable school he found it.

As he had now ceased to be a member of the Council, he might be permitted to state, from personal knowledge, that its members fully deserved the thanks of the Society. They had been most regular and punctual in their attendance, and most zealous in their endeavours to promote the usefulness and prosperity of the Society.

Mr. VASEY proposed and the President seconded a vote of thanks to the Secretaries, Treasurers, and other Officers of the Society.

Mr. OAKLEY COLES, in the absence of the Treasurer, briefly returned thanks and the meeting was adjourned.

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*Treasurer in Account with THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN,  
for the Session ending 31st October, 1878.*

[illegible]

ASSETS OF THE SOCIETY, OCTOBER 31st, 1878.

Receipts, 31st October, 1878.....	£509 11 4	Stock in New 3 per Cents .....	£1,134 17 4
Expenditure ditto .....	372 16 9	Cash at Bank and in Treasurer's Hands .....	542 14 3
Surplus over Expenditure .....	<u>£136 14 7</u>		<u>£1,677 11 7</u>

MEMORANDUM.—Average Surplus per Annum during the last Seven Years about £63.

STATEMENT OF DEATHS, RESIGNATIONS, MEMBERSHIPS LAPSED,  
AND NEW MEMBERS ELECTED DURING THE SESSION.

*October 31st, 1878.*

Number of Subscribing Members—Resident .....	109
"      "      "      Non-resident .....	195
	<hr/>
TOTAL .....	304
	<hr/>
Number of Honorary Members .....	30
"      Corresponding      "      .....	22
	<hr/>
TOTAL .....	52
	<hr/>
Deaths.....	0
Resignations .....	2
Lapsed from Non-payment .....	3
	<hr/>
TOTAL .....	5
	<hr/>
Members in arrear at Audit—Resident .....	8
"      "      "      Non-resident.....	9
	<hr/>
TOTAL .....	17
	<hr/>
New Members elected—Resident .....	4
"      "      Non-resident .....	17
	<hr/>
TOTAL .....	21
	<hr/>
New Corresponding Members .....	1



# ORDINARY MONTHLY MEETING,

*February 3rd, 1879.*

EDWIN SAUNDERS, ESQ., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting were read and confirmed.

THE PRESIDENT announced that Mr. W. H. Woodhouse had resigned the seat in the Council to which he had been elected at the last meeting, in order that the Society might still have the benefit of the experience and sound judgment of Mr. Alfred Woodhouse, who had last year filled the office of Senior Vice-President.

MR. ROBERT STRATTON COLES, 3, Prince's Square, Plymouth, L.D.S., R.C.S., Ireland, was proposed for election.

THE following gentlemen were then separately balloted for, and duly elected members of the Society :—

W. H. MARGETSON, Dewsbury.  
G. H. CROWTHER, Wakefield.  
JOSEPH J. H. SANDERS, Bangor.  
THOMAS BALCOMB, St. Helen's, Jersey.  
WILSON HOGUE, Bournemouth.  
HERBERT WOODRUFF, Leamington.  
EWEN TOD, Old Steine, Brighton.  
A. S. UNDERWOOD, Bedford Square.  
E. P. MAY, Euston Square.

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MR. HENRY MOON showed models of the mouth of a girl 13 years of age, who had curiously-pointed temporary teeth. "Some of those present would remember that two years ago

he had brought before the Society some cases of children whose teeth were of a conical form but were in conformation quite unlike the peg-shaped teeth characteristic of inherited syphilis, and were, as far as at present appeared, only to be regarded as one evidence of the weak development of the dermal appendages generally. He had since met with two or three very slightly-marked cases of the same kind; and recently Mr. Jonathan Hutchinson had kindly given him the opportunity of seeing the patient whose conical sharp-pointed temporary incisors and canines were shown somewhat worn down in the models passed round. The intelligent mother of this child stated that the only tooth which had been changed was the first temporary molar; the eruption of the permanent incisors had therefore been greatly retarded. With regard to the retarded eruption of upper front teeth, he should like to know if others had noticed that the failure of the upper permanent front teeth to erupt had been preceded (in such cases as they had seen) by an edge bite of the temporary teeth. He had seen several cases in which the two things went together, and was inclined to think that there was some connection between them. Might it not be that the straight downward pressure of a temporary tooth into its socket tended to retard the eruptive process in the case of its successor?

Mr. MOON also showed models of the upper and lower jaws of a youth aged 18. The upper lateral incisors and the bicusps in both jaws were absent, though the wisdom teeth in both jaws—and this appeared to him the special peculiarity about the case—were erupted. An absence of teeth was in this instance hereditary, for the youth's mother had the same teeth absent from her upper jaw; but in her case no wisdom teeth had appeared.

Mr. S. J. HUTCHINSON asked whether any of the other dermal structures were affected in Mr. Moon's case?

Mr. MOON said that the child was well formed and natural in other respects. In the cases he had previously reported there were curious ophthalmoscopic appearances, but this child's

eyes were normal. The mother stated, however, that at birth she had no nails on fingers or toes, and no hair on her scalp; but that she had a quantity of downy hair about the shoulders. In answer to Mr. Underwood's remarks, he would say that the apparent contradiction could be easily explained. The plate pressed on the gum, the part to be absorbed; the pressure promoted the absorption, and thus favoured eruption: but in his case there was increased downward pressure on the tooth itself. This meant increased *use*, and the usual effect of increased use of any organ was augmented vitality, and longer duration.

Mr. COLEMAN said he could quite appreciate the distinction which Mr. Moon sought to establish. A good example of the retarding effect of direct pressure was seen in the not very uncommon cases in which the first temporary molar became interlocked between the first bicuspid and the second molar; the eruption of the second bicuspid was thus greatly retarded. The good effects of diffused pressure on the gums in favouring eruption was indisputable: indeed the habit, universal amongst babies, of rubbing their gums with some smooth hard substance seemed to show that a knowledge of this fact was innate in the human species.

Mr. Coleman then read the following communication which he had received from Mr. Henry Rogers, and handed round specimens of that gentleman's detachable springs, in order that they might be compared with Hempel's springs, exhibited at the previous meeting by Mr. Oakley Coles:—

16, Dorset Square, *January 27th*, 1879.

DEAR MR. COLEMAN,—

I was absent from the Odonto meeting on the 13th, when you referred, in what I consider complimentary terms, to a form of swivel used by me for many years whilst practising in Hanover Square—in fact, I used no other after its introduction. My brother was unable to satisfy your inquiry as to its construction, and therefore I have pleasure in forwarding the enclosed description on the chance that it may interest you.



Wherever practicable, the attachment to the artificial denture was by a flat-headed screw, having a shallow shoulder, around which the eye worked. The eye-ring, where it surrounded this shoulder, differed from the ordinary, in being broadest where friction is greatest; namely, on the side towards the closed bite. The shank upon which the spring is forced, instead of being made, as usually, of solid wire, consisted of a thin tube split longitudinally, and rotating on a slender axis. One end of this axis was soldered into an aperture in the bent-up portion of the eye, and to the other end a small button was soldered to prevent the escape of the tube. Thus constructed the shank could accommodate itself by rotation to such relative variation in the planes of the screws and eyes as might arise during the spring's action; thus diminishing strain on the spring, and also any consequent tendency to displace the dentures on the gums. Another advantage was, that patients could themselves easily replace a broken spring by a new one; since much less than the usual force was required to attach and detach the spring, whilst the rotating tubes ensured coincidence in the planes of its two ends without any care on the patient's part. Of course, every shank and every spring-end was arranged accurately to the same gauge. The shank was shorter than in the ordinary swivel, which I considered an advantage. As to duration—even in cases where the wearing-away of the eye-spring was considerable—that of the tube and axis was scarcely appreciable. The various parts were machine-made, and the time and cost of production were about the same as of ordinary eyes.

With kind regards, believe me yours faithfully,

HENRY ROGERS.

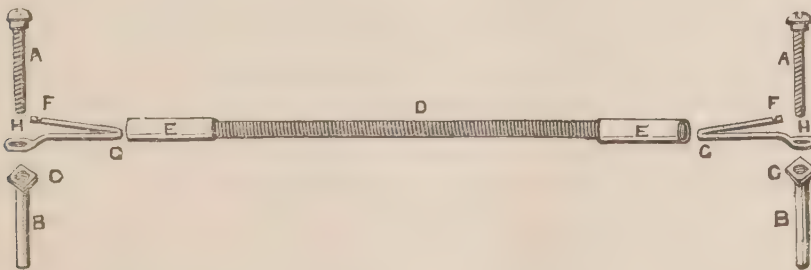
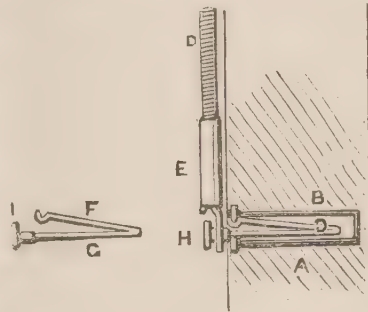
Mr. Coleman added that he had tried some years back to induce Messrs. Ash to make these swivels regularly, and to keep them in stock, but they had not thought it worth their while to do so. He hoped now that some enterprising maker would take the matter up, and that members of the profession

would be able to obtain them without the trouble and delay which had hitherto been necessary.

Mr. OAKLEY COLES said he had exhibited Mr. Hempel's invention simply because he had been asked to do so in his official capacity as one of the secretaries of the Society.

The following description and woodcut would probably render the subject clearer to those members who were not present at the previous meeting.

The springs (D) have their ends fixed in gold boxes (E), giving them a finish, both for comfort and appearance. The loops (F G H) are made on the principle of necklace-fasteners, and can be instantly attached to, or detached from, the springs, enabling a patient to remove and thoroughly cleanse them. As the springs readily revolve on the loops there is no fear of their being fixed on the *twist* by inexperienced hands, for they will adjust themselves. The bolts (F G I) are arranged on the same principle for removal, so



that patients can with ease use a set with springs, or by suction, as they feel disposed. Where this is not likely to be the case the bolts may be formed of a screw and socket (A B).

The PRESIDENT said he had examined Mr. Hempel's springs, and thought they were carefully and skilfully made: the plan involved, however, occasional disadvantages. If, for instance, the spring had to be attached to the band of gold round a tooth,

the soldering would materially diminish the elasticity of the clasp.

Mr. MOON said he always used Mr. Rogers' springs and swivels, and had done so for several years, ever since the invention had first come under his notice. He had found them most convenient, and a great improvement on the ordinary arrangement.

Mr. COLEMAN then showed a new face-piece for gas and ether inhalation, made by Messrs. Barth. The old plan was to make the face-piece of thin soft metal, covered with leather; this was adapted to the face by bending the metal to fit the inequalities. But the leather soon began to peel off, and after a time the metal itself was apt to crack, and the whole thing was useless. To obviate this, some had been made of firm metal, fitting to the face by means of an airpad fixed round the edge of the metal; but these were heavy and too rigid. That now offered by Messrs. Barth was made entirely of indiarubber: it was simple, light, efficient, and very durable.

Mr. COLEMAN also showed a model, illustrating the disadvantages of removing the two first bicuspidis in the upper jaw before the canines had fully descended, in order to allow room for the expansion of the front teeth. It would be seen, that although the bicuspidis were absent, the front teeth were very short and crowded, the lower teeth biting in front of the upper. He had fitted a plate to throw out the front teeth, bearing especially on the lateral incisors. The patient was 13 years of age.

The PRESIDENT said he quite agreed with Mr. Coleman that the removal of the bicuspidis under these circumstances was contrary to good practice.

Mr. CHARLES TOMES exhibited a model, showing the disastrous results which might be caused by the injudicious application of regulation-plates. The patient, aged 10 and a half, had been under continuous treatment for two years. She had worn a vulcanite plate capping all the upper teeth except the incisors,



and this was actually kept up by wires clasping the permanent lateral incisors: the object was to correct an underhung bite by pressing forward all the upper incisors. The result of this treatment was as follows. The lower incisors bit upon the backs of the upper incisors near to their tips. The latter teeth were excessively tender and loose, and when the plate was out of the mouth had to sustain the full force of the bite, as the continuous capping for two years of all the back teeth had resulted in so depressing the six-year-old molars and the temporary teeth that they were half-buried in the gum, and failed to meet their antagonists by about half an inch. The first bicuspid was just coming through. The question now was, how could this state of things best be rectified? He should have been inclined temporarily to suspend all treatment, but for the certainty that unless something could be done quickly to relieve the violent concussion between the upper and lower incisors the former would soon be lost. The upper centrals were in fact so tender and inflamed that nothing could be done with them at present. He had therefore fitted a plate bearing only on the remaining temporary teeth, with the view of allowing the bicuspid and the six-year-old molars to grow up to their normal level, and so take the force of the bite off the incisors; he was trying at the same time to draw back the lower incisors. The case was one of the most troublesome and perplexing he had yet met with, and he should be glad if any of the members present could suggest any improvement on the plan of treatment which he had indicated.

Mr. Moon thought that Mr. Tomes had clearly decided on the right plan of treatment. He thought, however, that with proper care most cases of underhung lower jaw could be advantageously treated before those of the temporary teeth. He had treated a child 8 years old successfully by means of a regulation-plate. In the case of a child 4 years old he had constructed a metal plate covered with rubber with a handle attached. The child was taught to hold this between the teeth, and to bite on it, and the frequent use of this simple instrument soon had the

desired effect. This child's father and grandfather were both underhung.

Mr. WALKER said he had treated a child aged 4 by means of a plate capping the lower teeth ; the child was now 7 years old, and his face was much improved. In that family the father, two sisters and a brother, were all underhung. In the case of another child, now under treatment, the father, brother, and sister were all underhung.

Mr. HUTCHINSON said that he had treated a child aged  $2\frac{1}{2}$  years successfully by means of a regulation-plate ; and in the case of an infant aged 15 months he had corrected an underhung bite by the simple expedient of teaching it to suck its thumb. He thought, however, that as a rule it was better to leave cases alone until the bicuspidis were completely erupted, and the 12-year-old molars were making their appearance. This was at all events the most favourable age, for, if you commenced treatment earlier, you could not facilitate the cure by the extraction of some of the temporary teeth, but, at the age he had indicated, extraction and expansion might often be combined with advantage to the patient.

Mr. COLEMAN said he had seen many cases of failure due to the mistake of commencing treatment too early. The case he had brought forward that evening was one of them. That youth had very crowded teeth ; in order to make room, the upper first bicuspidis were removed almost as soon as they appeared, and the result was that his front teeth were just as crowded as before. With regard to Mr. Tomes's case, he thought that in the conditions under which he found himself his proposed plan of treatment was excellent. He would suggest, that, in addition to the plates as now fitted, the child should wear a cap fitting closely to the head, with a strip of elastic webbing passing round the chin and pressing back the jaw. The surprising effect which could be produced by moderate pressure continuously applied was seen in the deformities resulting from the contraction of the cicatrices of burns, and he had seen very

good results from the above plan of treatment when applied at an early age.

Mr. OAKLEY COLES thought it was a mistake to treat the upper instead of the lower incisors for underhung bites. He agreed with Mr. Coleman that more benefit would often be obtained by acting on the lower jaw as a whole than by acting on the teeth. This plan of treatment could not be commenced too early, and at an early age the alteration in the shape of the jaw was easily effected. It should be remembered also that a regulation-plate only altered the position of a few of the teeth, and often left their relations to their antagonists very unsatisfactory ; but in pressing back the jaw all the teeth moved together and gradually, and they kept their register much better.

Mr. CHARLES WEST thought the best treatment to be pursued would depend very much on the contour of the patient's face. He thought he should have been inclined to fit a metal plate capping the lower incisors.

Mr. HENRY thought it would have been better to let the child rest until the bicuspid were erupted.

Dr. FIELD said it was impossible to decide as to the best treatment without seeing the patient. Judging only from the model, the front teeth seemed to protrude ; if so, he should use the elastic bandage. But if this was only apparent, and due to the bad management of the case, he should be inclined to extract a temporary molar on each side.

Mr. TOMES said he thought that most of the speakers had not fully appreciated all the difficulties of the case. He should have been glad to have left the case alone for a time, but this was impossible, for the upper incisors would soon be lost if they were allowed to continue to bite on the lower, and they must be saved if possible. Then the child's face would certainly be improved by pushing out the upper incisors ; but these were too tender for any treatment, however gentle ; so that he had to content himself with attempting to save the upper and with drawing back the lower incisors.



Mr. STEELE said he desired to call the attention of the society to the fact that the Worshipful Company of Cutlers, with which he was associated, had requested him to mention that in furtherance of the cause of technical education they intended to hold an Exhibition of cutlery at their Hall in London in May next. The exhibits will include a department of surgical instruments, ancient and modern, which embraces those used in dentistry. If any members having instruments of interest would kindly lend them for the occasion it would be highly appreciated. Letters upon the subject may be addressed to the Hon. Secretary of the proposed Exhibition, Mr. R. J. CHEESWRIGHT, Town Hall, Croydon, and would receive every attention.

The PRESIDENT then proceeded to deliver his Introductory Address.

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GENTLEMEN,—By your kind suffrages, and in fulfilment of a recent alteration in the mode of election, by which Past-Presidents alternate with those elected for the first time, I find myself again, after a lapse of fifteen years, in the honourable position of President of the Odontological Society. By this innovation, which was proposed by Mr. Vasey (in an admirable spirit of self-abnegation, for by it his own presidentship was postponed), and warmly advocated by my immediate predecessor in this chair, in the same spirit of self-sacrifice, it was thought that the identity, the traditions, and in some degree the prestige of the Society would best be preserved. To what extent these objects have been or are likely to be realized we are happily not now called upon to determine, but I may say, that, though I had begun to regard myself as retiring from all prominent and public engagements, yet, having yielded to the solicitation of some old and valued friends to accept the office, it will be my aim, relying upon your kind co-operation, so to discharge the duties as to promote most effectually the best interests of the Society. I trust it will

not be inferred from this that the honour of representing this Society was not duly appreciated, or that it was simply a case of preferring ease and avoidance of work. These considerations would have had but little weight if I had not felt a distrust of my own fitness for the office, and if I had not known that without this intervention the mantle would have fallen on shoulders well fitted to wear it with dignity. From old association, no less than from present achievement, this Society is very dear to me. I assisted at its birth, and may regard myself as its godfather, having proposed the name which, after many objections, as that it was uncouth, pedantic, too long, difficult to pronounce, &c., was at length unanimously adopted. Nor has that attachment ever wavered or suffered diminution, either by the seductions of novel associations or by those inevitable temporary suspensions of harmonious relations which are incident to all human institutions.

I should be more or less than human if I could resume this position after the lapse of fifteen years without some tinge of sadness mingling with feelings of satisfaction called forth by such a retrospect. Of how many who were endeared to us from earnest collaboration in the formation of this Society, and who, by their constant and genial presence, lent a charm to these gatherings,



are we doomed to say that their places know them no more ! How many whose names are honourably inscribed on yonder tablet, and whom we had come almost to regard as necessary to the very existence of the Society, are now gone from our midst ! But, having paid this passing tribute to their memory, we will indulge in no vain regrets over the irrevocable past, but rather rejoice that their places are so well filled by their successors, and that the Society lives in all its pristine life and vigour :—

“ For men may come and men may go,  
But *it* goes on for ever.”

There would seem to have been in all ages an ineradicable tendency in human nature unduly to estimate the known and the past over the untried and the present, for amongst the words of wisdom of a very early period is found a caution on this subject, “ Say not thou that the former times were better than these, for in that thou sayest not wisely.” I think we might seem neither very wise nor very candid if we could refrain from giving a cordial greeting to those who are so worthily filling or preparing to fill our places ; who, profiting by educational advantages which did not exist for their predecessors, devote their fresh intellectual energies, as yet undimmed and unwearied by the monotonous routine and the exhausting drudgery of an exacting profession, to

original scientific research and to the thorough investigation of all appliances, preparations, or modes of treatment, likely to be of advantage to the profession. While its ranks continue to be recruited with men of this stamp there should be no misgiving as to the future of the Society, but on the contrary every ground for assurance that it will long continue to represent the profession of Dental Surgery, to guard its interests, to promote and encourage scientific enquiry, and to be a rallying-point of social reunion. So far then from dwelling on the past with despairing or regretful interest, we will look forward with eager hopefulness to a career of increasing lustre and achievement. Many and great events have marked the period of which we have been speaking, a period rich in materials for history and full of grave results as affecting the political or social well-being of mankind, in some cases realising aspirations after unity, in others removing ancient landmarks, and leading to a rearrangement of geographical boundaries. It has witnessed the welding together of the fair and classic lands of the sunny south into one united Italy; and the rise and consolidation of the great German Empire, that fatherland so long the dream of the poet and the aspiration alike of the statesman, soldier, priest, and peasant; and it has also been witness to that stupendous duel between two

powerful nations foremost in the rank of culture and civilisation, the one pre-eminent in all that lends grace and charm to existence, and the other renowned for its learning and intellectual progress and occupying a high place among the philosophers, the poets, and the scientists of the age. Let it not be supposed that because we are specialists we can be unmoved by the events of the great world, or that the discoveries of science, in which this age is so peculiarly rich, possess no interest for us unless applicable to our own kind of work. Rather let us endeavour to keep abreast of the times in this respect, so as not to incur the reproach of being men of one idea, and with a limited range of thought. Nevertheless, citizens of the world though we may be, our chief interest must always centre round our own speciality, and this also has partaken of the general movement; we also have our history. This is not the fitting occasion for entering into the politics of the profession, nor, even if I possessed the requisite ability and knowledge of the subject, has the time arrived at which a sound judgment could be formed of the results of what has been recently accomplished in the way of Dental reform and legislation. That at length, however, and after much labour and thought, registration and a legal sanction have been obtained for our profession must be a matter



for unfeigned congratulation on the part of all who have its true interests at heart. This, which had only been too long delayed, may be regarded as the crowning of the edifice, the corner-stone of which was laid some twenty years since. Whether this might not have been obtained without a separate and special Act of Parliament, and whether its provisions might not have been restricted to the recognition of those only who practised Dentistry pure and simple, are questions which I for one am quite content to leave unsolved now that the great fact of registration is assured. And I do this the more readily because it was my misfortune to be unable to support the measure as it was originally drawn, placing in the same category and subjecting to the same penalties the educated Member of the Royal College of Surgeons and the mercenary and uninstructed empiric ; and I gladly take this opportunity of stating that it was this, and this alone, which prevented myself and others from the hearty co-operation which it would otherwise have had. This obstacle, which had too long blocked the way, was at length removed, and then your plenipotentiaries returned in triumph, bringing Peace with Honour. For thus they obtained such protection and such powers as must in time purge Dentistry of much at least that was hideous and humiliating to men of

culture and sensibility; and this without dissociating it from the great Surgical body, so that the question which had begun to be asked, Is Dentistry a profession or a trade? receives an irrefragable answer in the fact of such association; for if it be a profession, it can only be as a part of surgery: detach it from that august body and it has to create a status for itself which may be challenged; associated with it its position is guaranteed, and it receives its passport to public estimation. Another and not unimportant event, and one the value of which has scarcely received full recognition, is the removal of our representative institutions, the Dental Hospital School and Odontological Society, to the building in which we are now assembled. From the commencement of the organization of the profession these three institutions have been grouped together, and like three strands of a cord they acquire strength by association, an arrangement which it is to be hoped may long continue to their mutual advantage. In selecting our first home in Soho Square, we were more attracted, probably, by its suitability for the purposes of the Society than for those of a hospital. There was, it must be admitted, a handsomer and more symmetrical meeting room than we now possess, but beyond this single recommendation it was extremely ill-adapted for our various uses. Hid

away in an obscure corner where, from the confined space and the height of the surrounding buildings it was impossible to get the requisite amount of light or air, the work of the Hospital was carried on under very unfavourable conditions. But when the growing reputation of the School brought an annually-increasing number of pupils, it became evident that if it was to maintain its ground as a representative institution it must be removed to a larger sphere. As there were no available funds for such an enterprise, which involved not only the acquisition of new premises, but the disposal of those then in occupation, it became a rather serious responsibility. By the liberal co-operation, however, of many old and tried friends of the profession, the transference to the present building, affording ample space, light, and air, was effected without interrupting for a single day the work of the Hospital, and not only without incurring debt, but with a not inconsiderable addition to its small amount of funded property. Only those who can call to mind the close, imperfectly-lighted room, with its half-dozen chairs of various and almost equally unsatisfactory construction, and the tedious waiting for opportunities of practice in the former house, can adequately appreciate the change. It may be stated, however, that the income of the Hospital rose from £965 in 1873 to £1,455 in 1874, the



year of removal ; and the number of cases treated has increased from 21,904 in 1873 to 29,679 in 1877. At the same time the efficiency of the School was augmented by some thirty well-constructed chairs placed under favourable conditions of light, by which the tedium of waiting was obviated both to patient and pupil. It is not too much to say that such a development of both Hospital and School would have been impossible in the former building. It has been admitted that the superiority of the present building is chiefly apparent as regards the work of the Hospital and School, though the improved light and space for the Museum and Library amply compensate for any shortcomings in the Meeting-room of the Society. With all these advantages which, as a whole, are without a rival in any part of the world, it is difficult to discover a valid and satisfactory reason for the formation of another, I will not say a rival, Society. Of course it is competent to any number of men engaged in similar pursuits or who have been educated at the same school to associate themselves together, but when the machinery and organization of a Society, with its Transactions, its well-filled Library, and a Museum, such as can only be the result of years of discriminating care and labour, already exist, such a proceeding would seem to be rather a matter of regret than of congratulation.

The defection of old friends must always be deplored, and may be a source of weakness, nevertheless, conscious of our own strength and numbers and deprecating any idea of rivalry, we frankly acknowledge that in all that they have done as a Society they have upheld the profession and drawn closer the bonds that unite it to the Medical world.

So much for matters of moment of recent occurrence which claim a place in our own domestic annals. And having inflicted my tediousness upon you to this extent, I will not even glance at the discoveries and improvements which may have been introduced during the same period. It is true that these have been from time to time brought under the notice of the Society, but I cannot help thinking that in competent hands a *résumé* on this subject would well occupy one or more evenings during the present session. Shall I be thought too sanguine if I express the hope of soon being enabled to make an announcement to this effect? And now, in conclusion, I am tempted to throw out some loose speculative thoughts in reference to the future. The present time is one of change and of great intellectual energy, and a huge wave of discovery has set in, especially in reference to electricity, which while it may cause great changes in the aspect of modern social life, can scarcely be expected to be wholly

without influence on our own speciality. It can hardly be doubted that it will become pretty general at no distant time for the practitioner in our department to have the means at hand of directing a beam of electric light into the oral cavity. But it has other potentialities. Is it forbidden to hope that the nerves of sensation may be so acted upon by a continuous current with or without local narcotization, as to be for the time deprived of sensibility without permanent damage? May we not look for the good time when the work of the drill and of the excavator in the preparation of the cavity, always irksome, but amounting to torture in persons of delicate and sensitive organization, may come to be regarded with indifference, or will such a power be the outcome of the remarkable experiments of Professor Charcot? The control which he exercises over the nervous system of his patients, momentarily suspending or re-establishing sensation, now over the whole body, and now over one-half, and again reversing these proceedings, would seem to show that there is yet much to be made out in reference to Anæsthesia. Interesting, however, as these experiments are in a pathological, or even in a physiological point of view, their practical value is impaired by the fact of their being selected cases, in which the nervous system is attuned to a high degree of susceptibility, not unmixed, as has been



shown by Dr. Carpenter, with some amount of expectancy of the results sought to be produced. But may we not indulge the hope, both for our own sakes as well as for those of our patients, that we are on the eve of further discoveries in the way of local anæsthesia? Should it be thought incredible that this subtle force may come to the aid of the physician, and in the most literal sense throw a new light on disease? that the electric light may ultimately be made available for rendering the living body or parts of it luminous, so that morbid changes in important organs may be detected at a very early stage, and with the certainty of ocular demonstration? so that diagnosis shall be no longer a matter of conjecture or inference from symptoms, supplemented by the report of test tubes, as to the condition of secretions, or by stethoscopic audition, but of ascertained fact? Is there anything more hard of belief in such an application of electricity than that the vibrations caused by the peculiar pitch and tone of our own voice should be transmitted through miles of slender wire to be perfectly reproduced by means of vibrations identical in character? But to return to what concerns more immediately our own speciality. Will the time ever come when our proceedings will no longer be impeded by the deluge of saliva which is the natural concomitant

of work in the mouth? When instead of the ingenious hydraulic arrangements for draining off the saliva, now in vogue, we shall be in possession of means for temporarily arresting the function of the gland and so stopping its secretion? And, lastly, when we have eliminated those twin torments of the Dental art, sensibility of structure, and the invading moisture, shall we arrive at a material unobjectionable in colour, having the plastic, the preservative, and the non-conducting properties, as to heat and cold, of gutta percha, combined with such hardness as to make it resist the effects of attrition? The quest for such a material which may be more easily and quickly applied, and which shall possess greater homology with the tooth substance, is quite compatible with full appreciation of the present perfection of the art of using gold for this purpose, characterised by the high finish and technical skill which it has attained in the hands of our "kin beyond sea" as well as by many of our own countrymen, and even under this very roof. In possession of such a material how immeasurably would our usefulness be extended by economy of time, no less than by conservation of force. Is it Utopian to entertain such an expectation, which would abolish much that is irksome and much that is distasteful both to the operator and to his patient, and may it not be that the dentist of the future will recall with

wonder the time when four or five hours were expended in welding and condensing a mass of gold into one tooth? Those who can remember the laborious process of working the tusk of the hippopotamus as a base for artificial arrangements before the introduction of vulcanite, will be at no loss to detect in this a parallel case in respect to waste of energy.

Gentlemen, I thank you for the honour you have done me in again electing me your President, as well as for the patience with which you have listened to these perhaps profitless lucubrations.



# ORDINARY MONTHLY MEETING,

*March 3rd, 1879.*

EDWIN SAUNDERS, ESQ., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting having been read and confirmed,

Messrs. W. H. MARGETSON, of Dewsbury ; PERCY MAY, of Euston Square, London ; and WALTER CAMPBELL, of Dundee, signed the Obligation Book, and were formally admitted to membership by the President.

The following gentlemen were proposed for election :—

Messrs. EDMUND KEEN, King's Parade, Cambridge, and J. R. GOEPEL, of Mount Pleasant, Liverpool.

The PRESIDENT announced that Mr. Holford had sent a specimen of geminated teeth to the Museum, and that Mr. Percy May had presented the following books to the Library, viz. :—Ringer's *Handbook of Therapeutics*, Erichsen's *Surgery* (2 vols.), and *Berkeley Hill on Bandaging*.

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Mr. HUTCHINSON said there had been a notice on the cover of the "Transactions" for two months past that he intended to bring the subject of gold caps for guttapercha fillings under the notice of the Society. He knew that the practice was not altogether a new one, that it had already been adopted to some extent by the profession, but he was not aware that it had ever been actually brought before the Society ; at all events, he could find no mention of it in the "Transactions," and he had found the plan so useful that he thought it deserved some more public recognition than it had yet received. His practice was

as follows :—After filling the cavity with guttapercha in the ordinary way, he took a piece of thick gold, cut it to shape, soldered a small piece of spiral spring to the under surface of the cap, and, after heating this in the spiral lamp, he pushed it into the centre of the guttapercha. This method of using a piece of spiral spring as a holdfast he considered both a novelty and improvement. It was well known that guttapercha was the most suitable filling that could be used for some cavities, especially when they were situated near the cervical wall, but it had the great disadvantage of not being able to withstand the effects of attrition. The effect of adding the gold surface was to make the filling last at least three times as long as it would have done without it. By treating osteo-fillings in this manner a very satisfactory stopping could be made in a very short time. He had also made very good bridge stoppings in the same way, *e.g.*, between a bicuspid and a molar, to prevent food lodging between two fillings and pressing on the gum ; and although this plan of bridging fillings was usually condemned, he believed it to be useful in some few cases. In illustration of his remarks Mr. Hutchinson handed round some teeth stopped with a gold surface over guttapercha.

Mr. CLAUDE ROGERS said he had occasionally made gold caps to articulate on to stumps which had decayed below the gum, and the result had generally been very satisfactory. A case of this sort had recently occurred to him, and he was glad to be able to submit his work for the inspection of members. The tooth was a lower first molar, which had decayed below the gum on three sides, the buccal wall alone remaining. A model having been taken, the tooth was restored in wax so as to articulate with the bite ; from this wedges were made, and a cap of pure gold was struck up and fitted so as just to overlap the margins of the root everywhere. A ring was soldered into the inside of the cap for the purpose of holding it on to the soft stopping. Two screws were now placed, one in each root, so as to give extra support. Matrices having been placed next the adjoining teeth, Hill's stopping was carefully packed on to the root and around the pins up to the full natural contour of the

tooth. The matrices were then removed, the gold cap was thoroughly heated, and allowed to melt its way into the Hill stopping, aided by considerable pressure, until it was thoroughly home to the bite. The gold was then malletted and burnished round the margins, and finished off as an ordinary gold filling. A very perfect articulation was thus obtained. The patient was Mr. David Hepburn, who was then present, and had kindly consented to remain "on view" after the meeting.

Mr. STEELE said he had been in the habit for years past of capping soft stoppings with gold, and had obtained very satisfactory results. But he had met with one difficulty, and he should be glad to hear whether Mr. Hutchinson had also experienced and been able to overcome it—how did he manage to make the gold cap fit exactly to the shape of the cavity? This was an important point, for the more accurately you could fit the gold cap, so much the more perfect and lasting was the result.

Mr. ASHLEY BARRETT remarked that he could not think it was ever desirable to make a stopping common to two teeth. The plan was open to many objections, one of the most serious being that the mobility of the teeth, slight though it was, was sufficient sooner or later to cause the loosening of such a stopping, and then all the labour was lost.

Mr. RYMER said another objection to this plan was that if one tooth was cured, but the other became painful, and had to be extracted, the bridge stopping would cause a good deal of difficulty.

The PRESIDENT said he could cordially agree with the first part of Mr. Hutchinson's communication. He had found guttapercha a most useful filling in certain cases; nothing would answer so well for cavities below the neck, and he thought Mr. Hutchinson's plan of adding a gold surface most excellent, but with his concluding remarks he could not agree. He could not think it wise to make one stopping serve for two teeth.

Mr. HEPBURN said there was a very great difference in the



treatment which Mr. Hutchinson had advocated and that which had been adopted by Mr. Rogers in his own case. In Mr. Hutchinson's specimens the guttapercha showed beyond the edge of the gold, whilst in his case the gold covered the guttapercha completely. Mr. Rogers had made a perfect gold cap, malletted to fit exactly to the margin of the stump, so that there was nowhere any soft stopping which could be worn down by attrition.

Mr. CHARLES TOMES remarked that though theoretically it might have been thought advisable to fit the gold cap as accurately as possible to the shape of the cavity, practically this did not appear to be of much importance. He had found by experience that if the guttapercha was fairly covered, so that only a small extent was exposed, it did not get worn down appreciably. Between three and four years ago he had put a mushroom-like patch of gold on to a cavity on the masticating surface of a molar, which he had filled with guttapercha. Now it happened that only half of this surface was bitten upon, the rest of it having no antagonist in the upper jaw. Yet even now he could not detect that the guttapercha had been worn away more on the one side than on the other of the patch of gold.

Dr. FIELD said that in following the plan which Mr. Hutchinson had spoken of that evening it was certainly not necessary to make the gold cap fit very accurately. He felt bound to add that he objected strongly to bridging, and thought it bad practice. The gum was sure to become inflamed, and a purulent discharge was set up which was very disagreeable to the patient. He then proceeded to describe a method of capping stumps which he had occasionally practised. He took several thicknesses of No. 120 rolled gold, welded them into a band, and applied this in the form of a ring to the top of the root, so that it projected above the root about two-thirds the original height of the crown. Gold screws were then inserted into the root or roots of sufficient length to support the gold to be added as a contour. The cavity formed by the ring was filled with osteo, and afforded a solid foundation on which to restore the

contour of the tooth, bicuspid, or molar, whilst the screws securely attached the whole to the root. By this means an otherwise useless root might be restored to usefulness, and the necessity for an artificial plate avoided.

Mr. STEELE said he wished to draw the attention of members to the fact that in May next an exhibition of cutlery would be opened at the Cutlers' Hall, in London, in which there would be a section set apart for instruments used in surgery and in dental surgery. He hoped that members who might have in their possession instruments which were curious or interesting would send them for exhibition; he should be very pleased to take charge of anything so lent. The Cutlers' Company was taking great pains to make the show a success, and he felt assured that any contributions would be thankfully received and taken due care of.

The PRESIDENT asked whether Mr. Steele made this application to the members individually, or whether he wished to suggest that the Society in its corporate capacity should take part in the exhibition. The collection of dental instruments which was shown at the International Exhibition in 1862 was selected and arranged by a committee appointed by the Society, and the result was in all respects satisfactory. Would Mr. Steele wish the same course to be pursued in this instance?

Mr. STEELE said he should be very glad if the Council would consent to some such arrangement. A selection from the instruments in the Society's Museum would be specially acceptable.

Mr. RYMER said that members need not be in doubt as to the success of the exhibition. The fact that it was promoted by the Cutlers' Company, and the good names which appeared in the management, were sufficient guarantees that it would be a large and interesting show. He hoped that the Society would aid in so laudable an object as the promotion of technical education in England, and he would suggest that a small committee be appointed to receive contributions from members, and to select specimens suitable for exhibition.

The PRESIDENT said that the matter would be carefully considered by the Council.

The SECRETARY then read the following communication from Mr. E. Monteith Tod, of Brighton :—

“ Mr. President and Gentlemen,—With your kind permission I will bring before the Society a small matter which seems to me worthy of investigation.

“ I removed a very strong first lower molar tooth, jammed between the second bicuspid and second molar, from the mouth of a gentleman of middle life, a few days ago. He had been suffering from neuralgia for some time, which has since taken its departure.

“ It had been previously filled with amalgam by another practitioner, and the filling had failed.

“ The tooth extracted, I tried to split it in halves, but my excising forceps only succeeded in splitting off a large slice of tooth substance from the distal portion of the tooth, thus laying bare to my view the internal structure of the tooth, without, however, encroaching on the pulp-cavity.

“ Whilst tracing out the enamel prisms and the yellow mass of dentine, my attention was suddenly arrested by observing, just where in a young tooth would be found *the horns of the pulp*, a pink striated portion of dentine, in form closely resembling the horn of the pulp itself.

“ Thinking to pursue my investigation yet further, I proceeded to crush the tooth again, for I could not *split* it easily, and I found the main pulp-chamber filled with a mass of secondary dentine, indistinguishable with the naked eye from the dentine itself. Indeed, only in the pulp-chamber of the two roots was there any portion which was *not* calcified. The cavity which had been filled previously was apparently a large shallow cavity in the mesial surface down to the gum. Now here we seem to have a tooth, the subject of nerve-irritation, almost entirely calcified, and yet at a point not far distant from the enamel the dentinal tubuli have a peculiarly marked pinky appearance, as if, not wholly calcified and somewhat transparent,



they had been injected with a pale pink fluid; and yet below and above this portion of pinkish dentine, and effectually shutting it in, is the yellow mass of dentine filling up the entire crown of the tooth as it underlies the enamel.

"I presume the theory of the dentine being in any way vascular could hardly be entertained, or that the odonto blast cells were only partially calcified, for this pink portion of dentine seemed only to be towards the crown of the tooth, and was on all sides covered in by dentine of a typical character.

"It may be worthy of note that the bicuspid and molar had been resisting pressure *for years*, and indeed the bicuspid had not been able to force its way up, and was only a little above the gum, and its crown turned towards and pressing *hard* against the mesial surface of the tooth under consideration."

Mr. WEISS remarked that calcification of the pulp was not always accompanied by pain. Of this he had the following proof: he had removed a tooth from the mouth of a gentleman 92 years of age; on splitting it, he found the pulp-cavity completely filled with secondary dentine. But the patient had suffered no pain whatever; the tooth had gradually become loose in its socket, and would in a short time have dropped out had he not extracted it.

Mr. OAKLEY COLES asked whether Mr. Tod's patient had suffered from a recent attack of illness? The most marked examples of pink dentine which were met with occurred generally in the cases of patients who had recently suffered from typhoid fever.

Mr. HUTCHINSON said that all the additional information he could give about Mr. Tod's patient was that he had suffered for some time from severe attacks of facial neuralgia, which was not relieved by quinine, and yet could not be referred to any particular tooth. The only grounds for extracting this tooth were the presence of slight redness of the gum round it and some excess of sensibility when it was struck. After its removal evidence of a mild form of periostitis about the roots was found.

Mr. COLEMAN said it had occurred to him, and no doubt to others also, on several occasions when excavating a cavity, to come upon a portion of dentine which presented the peculiar pink, semi-transparent aspect which Mr. Tod had described. His first impression was, that he had got into very close proximity to the pulp-cavity, until careful examination had satisfied him that this was not the case. His own opinion was that this peculiar staining of the dentine was due to, or indicated the presence of, an early stage of necrosis. With regard to the fact that calcification of the pulp was frequently a cause of neuralgia, he could supplement Mr. Tod's case with a very similar one which had occurred in the practice of his friend Mr. Ewbank. A patient came to Mr. Ewbank complaining of severe pain. One molar was found to be carious, and was carefully stopped. The pain still continuing, the stopping was removed, but no cause for the pain could be found. At the urgent request of the patient the tooth was removed; on splitting it the pulp-cavity was found to be occupied by a free mass of secondary dentine,—a perfect cast of the cavity. In this instance there was no sign of periostitis, and no increased sensibility on percussion; the tooth was, however, somewhat sensitive to heat and cold; this was the only guide by which the offending tooth could be detected. Then diagnosis of such cases was very difficult; the dentist was forced to rely in great part on the judgment of his patient, but it was very important that he should himself take all possible precautions to avoid extracting the wrong tooth.

The PRESIDENT remarked that the earliest published notice of pink discoloration of the dentine with which he was acquainted occurred in Bell's work. It was thought by him to be due to inflammation, and was mentioned as a proof of the vascularity of dentine.

Mr. WALTER CAMPBELL, of Dundee, exhibited some dental splints, described his method of applying them, and related particulars of two bad cases of fracture of the lower jaw,

which had been treated by this means alone with very satisfactory results.

The first case was that of a gentleman about 55 years of age, who had fractured his lower jaw through the symphysis six months before he came under Mr. Campbell's treatment, but the fracture was still ununited. The patient, who occupied a good social position, strongly objected to wear any bandage, or any apparatus which would show externally. Mr. Campbell therefore provided him with an accurately-fitting dental splint; this was worn constantly for eighteen months and then dispensed with, firm union having taken place.

In the second case, the patient, a man aged 30, was admitted, under Dr. Campbell's care, into the Infirmary, who requested Mr. Walter Campbell's assistance. The jaw was broken close to the left canine, the larger fragment being drawn backwards towards the tongue by muscular action. This, of course, made the fitting of the splint more troublesome than in the other case, but, by the exercise of some amount of force, this was satisfactorily accomplished. The man was made an out-patient at the end of three weeks, and at the end of two months the splint was removed, very good and firm union having been obtained.

The upper jaw of the first patient was edentulous, and in the second case the teeth in the upper jaw on the left side were knocked out at the time of the accident, so that in neither case were there any upper teeth to antagonize with the lower, and to act as a guide in adjusting the position of the divided model. The chief point of interest was the method adopted to get the model of the fractured jaw to correspond with the normal position of the teeth previous to the fracture. This was effected in the following manner. Mr. Campbell first took an impression of the broken jaw in the usual way; from this a plaster model was made. This was cut across at the line of fracture, and a metal plate made for each half of the model. These two plates were put in their proper places in the mouth, and the two portions of the jaw were then brought closely into apposition and held there. An assistant now placed some plastic



stent round the junction of the plates, and the parts were kept in the same position until this was hard. The whole was then removed from the mouth, and the two halves of the model were inserted into the plates and fixed in plaster. The exact normal position of the jaw having been thus obtained, the plate which forms the splint was struck up over the brass plates, thus allowing space for a thin layer of guttapercha; this was applied to the mouth in the usual way, and the plates held firmly in position until it had quite set.

Mr. WEISS said he had obtained such satisfactory results from the use of the ordinary iron wire splint, that he had never found it necessary to use any other apparatus. The last patient he had treated by this means was a man whose jaw had been broken in two places by a kick from a horse. On his next visit to the hospital, two days after the accident, he found the patient eating his dinner without any great amount of discomfort, and he was made an out-patient three weeks afterwards.

Mr. TOMES mentioned the case of a gentleman who was attempting to ring two church bells at the same time. One of the ropes slipped from his hold, and on descending again the noose caught under his upper front teeth, lifting him up to the belfry ceiling, and then flinging him with great force across the loft. The result was a fracture of the upper jaw, between the canine and bicuspid on one side, and between the lateral and canine on the other. The intervening fragment was displaced almost at right angles to the face, and great force was required to replace it. Hammond's wire splint was used, and the fracture united without much trouble, but all the teeth attached to the displaced fragment had remained completely devoid of sensibility; there had been no abscesses, and they appeared otherwise normal. The question was, were these teeth alive? He should be glad if Mr. Moon would tell him whether he had found the nutrition of the teeth interfered with after severe fractures of the jaw.

Mr. MOON answered that after treating a large number of cases of badly fractured jaws he had found that the teeth

retained their vitality in a surprising manner. He had never yet met with a case of sphacelus of the dental pulp subsequent to fracture of the jaw.

Mr. COLEMAN remarked that the vitality of the teeth would depend more on its vascular than on its nervous connections, and loss of sensibility would not be necessarily accompanied by deficient vascular supply. The latter was quickly made good in such cases by anastomotic channels, whilst sensation was not regained until a slow process of repair had taken place in the original nerve-filaments. He should not despair of the ultimate restoration of sensibility until a very considerable time had elapsed.

Mr. SEWILL mentioned a case he had seen at St. Mary's Hospital in which sensation had been restored many months after the accident by means of the persevering use of galvanism.

Mr. HENRY showed a case in which he had introduced a novel arrangement. He had to fit a denture to the lower jaw, and wished to avoid the use of springs, if possible. Unfortunately, the alveolar process was very flat ; there was no ridge to afford an attachment, but by prolonging the inner edge of the denture so as to grip the mylo-hyoid ridge, he was able to obtain a sufficiently secure attachment. The denture had now been in use for twelve months, and his patient was quite satisfied with it.

Mr. CHARLES TOMES then proceeded to read an abstract of Dr. Magitot's paper.

*An Epitome of Dr. Magitot's Paper upon the Replantation of Teeth (Bull. et Mém. de la Soc. de Chirurgie. Février, 1879). Communicated by CHARLES S. TOMES, M.A., F.R.S.*

ALTHOUGH the subject of replantation of teeth is by no means new, and has been on many occasions brought before the notice of this Society, it has been prominently called to mind of late by the appearance of paragraphs in public newspapers, these paragraphs owing their origin to a short memoir communicated to the Académie des Sciences (*Comptes Rendus*, Février, 1879), which short memoir is but an abstract of the more important paper by Dr. Magitot, to the contents of which I propose to call your attention.

The paper does not touch upon transplantation of teeth, but solely the replantation proper, after the removal of any portion of root or periosteum that is much diseased. It derives its great importance from the minute accuracy with which the cases are detailed, from their number, and from the severity of the complications with which many were accompanied: in these respects it is by far the most valuable and conclusive contribution that has been made to the subject.



Before going further I shall explain my own position in the matter. I have very small personal experience of the operation, I have seen but few cases, and I should be very sorry to appear desirous of associating my name with a matter at which I have not worked. It is, however, my privilege to be acquainted with Dr. Magitot, and, at the suggestion of our Secretary, I wrote to ask him if he would be so kind as to furnish us with some account of his experiments to serve as our text for discussion to-night. My appeal on this, as on previous occasions, met with a generous response in the form of the published paper in the *Comptes Rendus*, and the proofs of this longer paper, which is not as yet published anywhere, but will appear in the "Bulletins et Mémoires de la Société de Chirurgie," together with a letter authorising me to make what use of them I pleased.

The very short time at my disposal has rendered it impossible for me to do justice to my task, but it seemed to me best to note especially those points in which Dr. Magitot's procedures differ from those of other writers on the subject, whilst I would recommend all who are interested to peruse the original memoir carefully for themselves.

Dr. Magitot commenced his experiments in 1875; his cases amount to sixty-three, of which

only five have been failures, but as some of these are very recent, he publishes his first fifty cases only, including all of the five failures. Six operations were performed in 1875; fourteen in 1876; eighteen in 1877; and twelve in 1878.

The indications for the operation he holds to be the existence of chronic periostitis of the apex of the root, its denudation, absorption of its surface, &c., which he terms a sort of partial mortification of the root.

The resection of this, which plays the part of irritant, which is seldom practicable without extraction, is the essential aim of the operation.

The extraction having been performed with due care, if no other lesion be detected save the alteration in the apex of the root, the tooth is to be replaced as soon as this has been excised and smoothed, and the hæmorrhage has ceased: if there be caries, the cavity is to be filled before it is replaced.

He seldom found it necessary to retain the tooth in position by guttapercha caps or the like, and the only after-treatment commonly resorted to was the laying of slips of lint, dipped in a solution of chlorate of potash, between the lip and the gum.

The existence of an open fistula he found to be so advantageous that he sometimes made one, maintaining it for some days with a seton: in

some cases a platina wire was left traversing the bone from the palatine to the labial aspect for some weeks. Much stress is laid by Dr. Magitot upon the maintenance of free drainage, especially in the severer cases.

The success of the operation he holds to be wholly dependent upon the existence of a complete ring of healthy periosteum on the replanted tooth: if it has been destroyed, or is very unhealthy as far up as the neck of the tooth on any part of its circumference, he believes that it will fail always.

When it succeeds, the cure takes, on an average, ten or a dozen days: the failures occurred one on the sixth day, one on the tenth, one on the twelfth (by extraction), one after two months, one after four months (extraction).

The minimum time recorded amongst these cases, as successful, is four months: the ages of the patients range from eighteen to fifty-five, and age does not appear to have influenced the result. In fifteen cases there was periostitis, but no caries.

As I have already mentioned, many of Dr. Magitot's successful cases might have been regarded as very unfavourable, owing to the existence of complications. Thus, cases in which a fistulous opening under the chin had existed were successfully treated, as were others in which large palatine abscesses coexisted with fistulous opening



on the gum anteriorly, and others in which there were sequestra. Amongst the more interesting complicated cases, I may cite one in which there was swelling in the region of the second lower molar, with incomplete anæsthesia of the corresponding lip and anterior teeth ; about one-sixth of an inch was removed from each root, and the tooth successfully replanted. The anæsthesia had become notably less a fortnight afterwards, when the case was lost to view.

A lateral incisor, which had been the original cause of a palatine cyst, was replanted, the cyst, which was as large as a pigeon's egg, having been opened from the palate, and a drainage tube introduced ; fifteen months afterwards the cyst was shrunken and solid, and the tooth firm.

As an example of the manner of securing drainage, I may cite his first recorded case.

M., æt. 30. Fistula over right upper lateral, and large palatine swelling, which was dusky and carious. It was extracted, found to have one-sixth of an inch of apex bare and rough, and the periosteum of half its length injected and thickened. The bare end was resected, but the thickened periosteum not interfered with, and the tooth replanted.

Three days afterwards, the tooth remaining very loose, and the discharge of pus very copious, a platina wire was introduced by the help of a

stylet at the palatine fistula, and with much trouble brought out at the orifice on the labial aspect of the gum, its ends knotted together, and tucked away between the canine and first bicuspid, where a space happened to exist. Some general fever ensued, and some general stomatitis; but in a fortnight from the date of the first operation, the tooth was well, and remained so for six months at least, when the patient left the country.

In the case of a young lady, *æt.* 17, there existed a chronic alveolar abscess, a little swelling of the cheek, and tenderness and enlargement of the submaxillary glands. One root was considerably shortened, and the tooth replaced. A shivering fit of some severity followed the same night, sleeplessness and fever (no temperature is given) persisted for several days and nights, though the local condition was progressively ameliorating. On the fifth day the patient went into the country and returned on the tenth, in all respects well again. Four years afterwards the tooth remained firm.

Dr. Magitot will forgive me, I doubt not, if I now turn to an examination of his failures, from which oftentimes most may be learned.

The first had every promise of success, save that it was never brought down to its proper length, and ultimately had to be shortened by

fling; in two months it was ejected, and we may take it as probable that perfect juxtaposition of the root and its socket had never been attained.

The second appears to have failed (in six days) from an insufficient amount of live periosteum remaining upon the root, the entire right antero-lateral face being denuded.

The third, extracted by the patient himself on account of pain, Dr. Magitot believes to have failed through there having been no patulous fistula through which discharge of long standing could drain away.

In the fourth, abscesses recurred again and again, the tooth remained long and tender, and was extracted six months afterwards.

The fifth, complicated by palatine abscess, was lost by failure to secure adequate outlet for the pus.

I have but little to add to the foregoing account of the nature of Dr. Magitot's paper. The impression left upon one's mind by a careful perusal of his cases, which are fully detailed, is, that there is hardly any case of chronic periostitis confined, or nearly so, to the apical third of the root which may not be successfully treated, and the tooth retained for some years at least; but sometimes at the cost of some little suffering, requiring no little endurance on the part of the patient. Pain,



however, seems to have been often surprisingly little felt.

There is no anatomical reason whatever why perfect union of the periosteum should not take place, and doubtless it does take place, so that presumably these replanted teeth may, in the most successful cases, have as much real connection with surrounding parts as any dead tooth has. But there is an accident to which replanted teeth are liable which I do not see how we can contend against, and that is, complete absorption of the roots. I myself removed a wisdom-tooth, which had been extracted, filled, and replanted a year previously by an enterprising foreign practitioner (who claimed to be the originator of the operation), which had almost wholly lost its roots, and we have a similar specimen in the Museum.

I have had more experience of the excision of the apices of roots without extraction of the teeth : this is an operation much less formidable and more feasible than might be supposed. The hole through the alveolus in a case of chronic alveolar abscess is generally of some size, and the dilatation by slips of lint of the fistulous opening in the gum often is easy ; or a single application of nitric acid or potassa  $\bar{c}$ . calce will form a sufficient opening. With the aid of the engine and a sharp drill a small orifice will suffice for boring through and cutting off the apex of the root, and this is often followed by the happiest results. But

in two cases in which I performed this operation, some three or four years ago, considerable absorption of the alveolus has ensued, and one of the teeth (a lower canine) is now bare in its whole length on its labial aspect. However, so far, it is quite firm, there is not a trace of suppuration, and it is, and always has been, quite comfortable.

With our best endeavours in the way of treatment of dead teeth, we occasionally fail in rendering them non-irritant, innocuous bodies, even where the root is single, and of some size. My own notion, and it is no more than a notion, is, that in such roots the protoplasmic material which occupies the dentinal canals and the lacunæ of the cementum has undergone some form of decomposition, and our disinfectants fail to permeate the tissues so as to render it innocuous. On some such hypothesis as this we could understand how the removal of an apex of a root, denuded of its periosteum, should make all the difference between toleration and non-toleration of its presence.

And it occurs to me as I write that the occurrence of inflammation, death, and subsequent putrefactive decomposition of a pulp which has never been exposed to the air, is worthy the attention of those who maintain that putrefactive decomposition is invariably the result of the access of germs. It is hard to see how they can have obtained admission, and it will be well worth

while for any one who has the opportunity to examine with all due precaution the fluid from a dead pulp, which has certainly never been exposed, with a view to seeing if it contains bacteria.

I should have noted before that Dr. Magitot lays no stress in his paper on the use of carbolic acid or other disinfectant, but washes the teeth simply in tepid water.



## DISCUSSION.

The PRESIDENT said he was rather glad to find that Dr. Magitot's paper was not of such a sensational character as might have been expected from the references to it which had appeared in some of the daily papers. Dr. Magitot confined himself to replantation of teeth, whilst the paragraph he had read in the *Times* spoke also of transplantation and of the teeth of the lower animals being made available to supply deficiencies in the human subject. He feared that the general public would be disappointed when they learnt how unduly their expectations had been raised. At the same time the paper was a very valuable one; Dr. Magitot was entitled to great praise for the skill and perseverance with which he had carried out the treatment he had decided upon, and which had ultimately been attended with such unprecedented success. The thanks of the Society were certainly due to Dr. Magitot for the courtesy with which he had placed his results before them, and to Mr. Charles Tomes for the trouble he had taken in preparing so clear and instructive an abstract.

Mr. COLEMAN said he felt bound to claim for himself and Mr. Lyons some of the credit which had been given to Dr. Magitot. They had practised this mode of treatment pretty extensively, and with a fair amount of success some time before Dr. Magitot had begun to turn his attention in that direction. So long ago as March, 1870, he had read a paper before the Society at its old quarters in Soho-square, in which he had advocated extraction and replantation as a means of saving teeth affected with chronic periostitis when all other means had failed. The plan followed by Mr. Lyons and himself differed in some respects from that adopted by Dr. Magitot. They had as far as possible made use of the precautions suggested by the antiseptic system of surgery. After removing

the tooth, they had cut off the apex of the fang if much diseased, scraped off any thickened portions of periosteum, and then replaced the tooth after washing both it and its socket with some antiseptic solution. He was obliged to confess that his success had not equalled that of Dr. Magitot. Some of the replanted teeth came away in a stinking condition, and without a vestige of periosteum. In a larger number the roots were absorbed and the teeth dropped out, but a large number were saved, every one of which must have been lost but for the success of this mode of treatment. The conclusion he arrived at was, that although the treatment might never come into very general use, yet that it was a valuable resource to fall back upon, and a plan which might be carried out with advantage in certain cases.

Mr. WEISS said he had hoped to have been able to exhibit a model showing the result of an interesting case of transplantation which he had performed eighteen months ago. In August, 1877, a man came to the hospital with a right lateral incisor badly carious, whilst its fellow on the left was crowded quite out of line. Both the teeth were extracted, and the sound tooth from the left side placed in the vacant space on the right, where it soon acquired firm adhesions. When he last saw the patient, in June, 1878, the tooth remained sound and in good position. He had inquired about him lately, with the view of bringing him forward at that meeting, but found that he had gone to Leeds. He had promised, however, that when next he came to London he would call and show himself again at the hospital.

Mr. HENRY said he knew of a successful case of replantation of twenty-five years' standing. In the year 1853 a practitioner in extracting a lower six-year old molar extracted also the second lower bicuspid. The tooth was immediately replaced, soon became firm, and had been a useful tooth ever since, though the patient said it was apt to become a little tender in wet weather. The following case had occurred in his own practice: A boy came to him with one of the upper central

incisors hanging half an inch below the other teeth, and quite loose. He replaced it, secured it as well as he could to the adjoining teeth, and it was soon as firm as before. Eighteen months afterwards the patient came again, having loosened the same tooth a second time by an accidental blow. It was treated in the same way, and the result was again successful.

Dr. FIELD said he readily acknowledged the great interest attached to Dr. Magitot's experiments, but he had never found it necessary to resort to the practice of replantation himself, and the result of the few cases he had seen in the practice of others had tended to confirm him in his low opinion of the value of this mode of treatment. He believed that alveolar abscess could be treated in other ways with a still smaller percentage of failures. He was interested to hear that Dr. Magitot attached importance to the establishment of a fistula communicating with the apex of the root. He himself believed that this plan of allowing free exit for discharge was the great secret of success. But if the fistula had to be established and kept open, where was the need for extraction and replantation? The treatment could be carried on quite as well through the root canal without disturbing the tooth at all. The apex of the fang if diseased could also be excised and removed through the gum without extraction of the tooth. Mr. Tomes had mentioned absorption of the socket as having followed in one of Dr. Magitot's cases. This was not specially a result of the operation, but might occur after treatment by other means. He believed it to be a consequence of extensive periosteal inflammation.

Mr. GADDES said that in the cases that had been recorded, nothing had been said as to the condition of the pulp and the pulp-cavity. In those instances in which the teeth had been replaced without the contents of the pulp-cavity having been removed, what became of the pulp? Was there reunion of the ruptured vessels and nerves, and the vitality of the pulp thus maintained—or did the pulp die? If so, what became of it? The fact was known to those present, that in many cases



disintegration of the tooth-pulp took place, and the products of decomposition were absorbed as readily as formed, and there was virtually no abscess-sac. But under certain conditions, as the patient getting below par, the ratio between decomposition and absorption altered, and discomfort resulted, yet this would disappear by a little treatment, or by the patient regaining vigour. There were certain pathological questions which had to be solved before the *modus operandi* of replantation could be understood.

Mr. WALTER CAMPBELL said that between three and four years ago a lady, who was possessed of very good and regular teeth, applied to him because her right upper central incisor was  $\frac{1}{8}$  inch shorter than the neighbouring teeth. The tooth was quite firm, but by gentle manipulation he managed to draw it down into line with the others. No ill effect followed, and the tooth was still sound and healthy.

Mr. GEORGE TORPEY said he had had some experience in the practice of replantation. He had performed the operation twenty-three times without a single failure, and had only found it necessary to tie in the tooth upon one occasion. As it was so late in the evening he would not enter into any particulars, but would refer members to this month's number of the *Review of Dental Surgery*, in which they would find his cases recorded in full. He thought that the operation was one which deserved the serious attention of the profession.

Mr. LYONS said that before comparing the results of Dr. Magitot's treatment with his own he should like to be assured that Dr. Magitot had been as careful as himself in operating upon none but the most unpromising cases. He could state emphatically that of the forty cases he had treated by replantation, not one could have been saved by any more conservative means. Then in comparing replantation with other modes of treatment, the saving of time and trouble to the patient must be taken into account. The ordinary treatment of alveolar abscess lasted several weeks and necessitated a considerable number of visits, whilst in the case of extraction and

replantation the chief part of the treatment was completed at one operation, and a much smaller number of visits generally sufficed to complete the case.

Mr. TOMES said he would confine his reply within a very few words. He was sorry that Dr. Field's experience of the result of the operation had been so unfortunate. Dr. Magitot had only found it necessary to grind the cusps of a tooth in one case, and that had ultimately turned out a failure. The fistulæ were generally kept open but a very short time—the longest period was seven weeks.

The PRESIDENT then proposed the usual vote of thanks to those who had contributed to the interest of the meeting.

This being carried unanimously, the meeting adjourned.







*W. H. Woodbury, Jr.*

SAMUEL CARTWRIGHT, F.R.S.







## ORDINARY MONTHLY MEETING,

*April 7th, 1879.*

EDWIN SAUNDERS, ESQ., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting having been read and confirmed,

Mr. R. STRATTON COLES, L.D.S., Ireland, of 3, Prince's Square, Plymouth, was balloted for and unanimously elected a Member of the Society.

The following gentlemen were proposed for election, viz. :—

THOS. A. ROBERTS, L.D.S., 49, Charlwood-street, Belgrave-road, S.W.

EDWARD FOTHERGILL, L.D.S., 5, Elden-square, Newcastle-on-Tyne, Non-resident.

EDWARD G. BETTS, L.D.S., 21, Freegrove-road, Holloway, Resident.

CHAS. D. COOK, M.D., 133, Pacific-street, Brooklyn, New York, Non-resident.

GEORGE L. PARMELE, M.D., D.M.D., 25, Prall-street, Hartford, Connecticut, Non-resident.

GEORGE T. MOFFATT, M.D., D.M.D., 196, Royston-street, Boston, U.S., Non-resident.

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Mr. RANGER exhibited an upper denture to which an arm was attached to serve as a support for the nose in a case of syphilitic disease of the septum. The patient, a young man 22 years of age, contracted syphilis in India ; the disease ran

a bad course, he was invalided home and admitted into St. Thomas's Hospital two years ago, under Mr. Croft. Mr. Ranger was requested to remove some suppurating stumps; he found that a portion of the hard palate and the whole of the septum of the nose had been lost by necrosis; the skin and soft parts of the nose were perfect, but for want of support lay almost flat on the face. Some months later Mr. Ranger extracted the remaining stumps, and then fitted the patient with an artificial denture: to the upper part of this he attached a piece of stout gold wire, curved into a semi-dipsi and tipped at the free extremity with a small cone of gutta-percha. This could be introduced by the patient himself through the opening in the hard palate, and served its intended purpose in a very satisfactory manner, restoring the patient's nose to a very presentable shape.

Mr. OAKLEY COLES said that a case was recorded in Johnson's "Dental Miscellany," which Dr. Norman Kingsley, of New York, had treated in the same way. The only difference was in the shape of the spring; Dr. Kingsley's had a double curve, so that the integument was supported at one point only. Mr. Coles thought that there might be some danger of ulceration from resting the whole of the weight on one point, as Mr. Ranger had done.

In answer to questions from the President and Mr. Hutchinson, Mr. Ranger said that the addition of the support was an afterthought. The patient had worn the plate for three months, when, at his earnest request, Mr. Ranger undertook the additional task of restoring the shape of his nose. He had worn the support for five months, and there did not appear at present to be any danger of ulceration. With regard to the shape of the wire, that must certainly depend upon the circumstances of the case. He felt sure that in the case under discussion it would be impossible to introduce a support of the shape described by Mr. Coles. He had decided upon the best form for his patient only after a great many trials. He drilled a small hole in the plate and passed a probe through, withdrawing

it and giving it fresh curves until he had obtained the best result he thought possible: he then fixed the probe in position with wax, and withdrew it and the plate together. He had attached the plate by wires in the first instance, but found that they were not required; it was retained very well by suction.

Mr. OAKLEY COLES then described a plan he had adopted for filling a large crown cavity in a molar tooth. Having excavated the cavity, he placed a little sponge gold at the bottom; on this, in the centre of the cavity, he placed a plug of gold wire, cut to the proper length and shaped like a dice-box. A rope of gold was wound round this and condensed, the rest of the cavity was then filled up in the ordinary way, and the whole finished off with the burr. By this means a more solid plug could be formed in less time and with less labour than by the usual methods of filling.

Mr. OAKLEY COLES then read the following casual communication "On a Tumour arising from the Root Membrane," &c. :—

Tumours arising from the periodontal membrane are of comparative rarity, if we may judge by the literature that has appeared on the subject. They are alluded to in the briefest manner, only, in *Tomes*,\* and but one case is cited by *Salter*† as having been observed by himself, whilst another case is reported by *Sewill*,‡ and one also by *Moon*.§ They are not specially referred to in *Heath*,|| but an excellent account of these formations will be found in *Wedl*.¶ This last-named author has apparently observed but few cases, however, and quotes chiefly from the paper by *Magitot*.\*\* This author

\* "Dental Surgery," 2nd edition, 1873.

† "Dental Pathology and Surgery," 1874, p. 167, from the "Transactions of the Pathological Society," vol. v. 1854.

‡ "Transactions of the Odontological Society."

§ Bryant's "Surgery," 2nd edition.

|| "Injuries and Diseases of the Jaws," second edition, 1872.

¶ "Pathology of the Teeth," p. 316. Philadelphia, 1873. Translated by Boardman.

\*\* "Mémoires sur les Tumeurs du Périoste Dentaire." Paris, 1860.

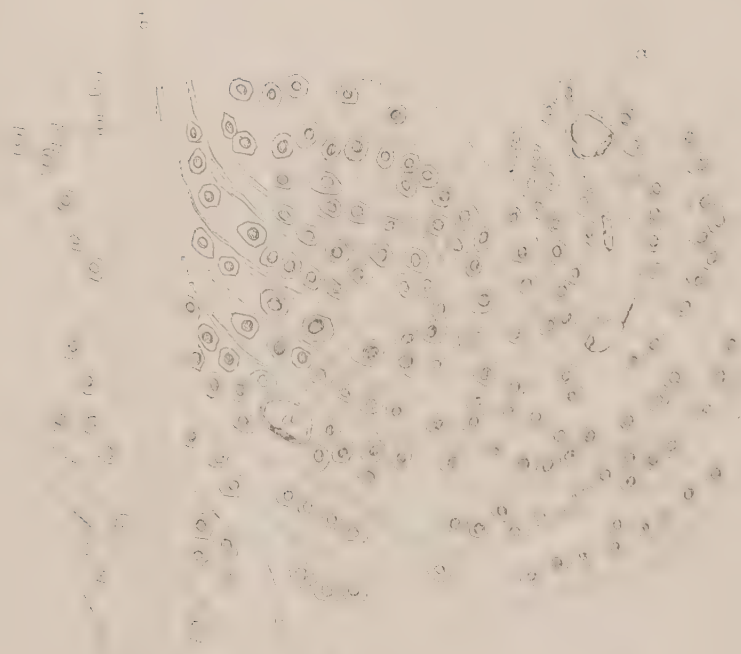


(Magitot) has observed and carefully recorded eighteen cases—ten occurring in the upper and eight in the lower jaw. Only one tumour was in connection with a temporary molar, in a child  $3\frac{1}{2}$  years old, the growth being epithelial in character.

The case of my own that I have now to record, occurred in a lady aged about 49. The tooth to which the tumour was attached was a second lower molar on the right side. The crown of the tooth was chiefly made up of a mass of amalgam that had been patched up and restored for nearly twenty years. The patient applied to me for removal of this tooth, as it was loose, and a source of irritation to the side of the tongue. There was no sign of an alveolar abscess, but the age of the patient and the abrasion of the tongue caused me to take more than common care in extracting the tooth. The operation was a very simple one, and performed without the least difficulty, but I noticed a fleshy mass attached to the side of one fang near its apex. It was about 12 millimetres long and 6 millimetres at its greatest diameter. It was firm in consistence, and attached to the membranes investing the fangs of the tooth, by a pedicle of nearly 3 millimetres in thickness. It occupied a position in the alveolus to the side, and slightly inferior to the apex of the fang, and resembled, at first view, an ordinary abscess sac. The nature of the attachment of the tumour to the periodontal membrane, and its general consistence, induced me, however, to doubt the correctness of this conclusion, and I therefore put it aside in order to make a careful microscopical examination of its structure. This was, however, most kindly undertaken for me by my friend Dr. Klein, the eminent histologist of Bartholomew Hospital Medical College, who pronounced it to be a round-cell sarcoma, and I have the pleasure of submitting for consideration his report on the tumour, and two very carefully executed microscopical drawings that he has been good enough to prepare for me in order to show its minute structure.

There is one other point of interest connected with the question, and that is the nature of the new growth and the tissue from which it grew—Rindfleisch has observed that the







simple round-cell sarcoma finds its favourite place of origin in "the periosteum and the sheaths of the nerve-centres."\*

My reasons for bringing this case forward are as follows :—

1. According to the published records of such growths, they are very rare, and therefore the description of each additional instance in which they occur has a certain value.

2. Such a tumour if left alone would, we may reasonably suppose, increase in size and become a source of serious anxiety to the patient, and hence its removal at an early date becomes a matter of clinical interest.

3. But my chief reason for drawing attention to the subject of "tumours arising from the root membrane" is that I cannot help thinking they are of far more frequent occurrence than previous experience would lead us to expect. I cannot have been singular in my experience when I first regarded the specimen under consideration as an ordinary (though large) abscess sac, and it seems only reasonable to suppose that many similar specimens have been thrown aside without a microscopical examination having been made of their structure.

I believe that if all masses of new growth found connected with the fangs of teeth were carefully examined, we should in the course of a few years obtain some very important and valuable data in connection with the origin of the larger and more serious tumours of the jaws. I need not enter into a description of the varieties alluded to by Magitot and Wedl, as the works are in the library of the Odontological Society.

#### DESCRIPTION OF PLATE.

Figure drawn under magnifying power of about 450°.

a. Capillary blood-vessels.

b. Trabecula of fibrous connective tissue. In connection with it are numerous fine connective-tissue bundles, taking a more or less curved course. Between these are numerous uni-nuclear round cells.

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\* "Pathological Histology," American edition, Philadelphia, 1872 p. 134.

## DR. KLEIN'S REPORT.

The great mass of the tumour consists of trabeculæ of fibrous connective tissue of various thickness ; they cross each other and branch so as to form a plexus ; in the meshes of this tissue lie crowded together uni-nuclear round cells. These are in many places, especially where their number is not too great, arranged between fine bundles of connective-tissue fibres which are more or less curved, and may even possess an almost concentric arrangement. The cells vary slightly in size, are spherical, or angular when pressed against each other, and each possesses a spherical eccentric nucleus. A few large blood-vessels are found in the large trabeculæ, and also capillary blood-vessels may be met with between the minute connective-tissue bundles.

Mr. COLEMAN remarked that it would certainly appear that growths from the periosteum of the jaws were more common than they were formerly supposed to be. Epulis originated in the periosteum, and so did cystic tumours ; then Mr. Tomes had lately shown that hypertrophy of the gums took its rise from the periosteum within the margin of the sockets, and now Mr. Coles had called their attention to another form of growth, which had hitherto almost escaped recognition, but which there seemed good reason to believe might not prove to be very rare, if it was diligently looked for.

Mr. HUTCHINSON said that Mr. Coles' communication would certainly cause him to examine all growths on the roots of teeth more carefully than he had hitherto been in the habit of doing. It would be interesting to know whether the tumour described by Mr. Coles was at all allied to the ordinary epulis, which was also a sarcomatous tumour, but was generally of the spindle-celled variety.

Mr. GADDES said that sarcomata were usually divided into three classes : the round-celled, the spindle-celled, and the myeloid. The round-celled variety, to which Mr. Coles' specimen belonged, was usually considered the most malignant of the three. Epulis he considered a most unfortunate term ; so

far as the etymology of the word went ; any tumour of the gum, whether simple or malignant, was an epulis, and it was only from custom that the term had become restricted to a non-malignant growth. He should much prefer a nomenclature based on the anatomical structure of the tumour.

Mr. COLEMAN then read a communication from Mr. Robert Waller, of Cairo, describing his successful treatment of a case of perforation of the palate, due to gunshot injury. The subject of this short communication was an Egyptian gentleman of rank, who was injured by a bullet entering the mouth, penetrating the hard palate, and coming out just below the outer angle of the right eye, which mishap occurred about twenty-four years ago. After the wound had fairly healed, he had a bone plate made, covering the palate, and to which two incisor teeth were subsequently added. This appliance, though fairly serviceable, was never satisfactory, as the air which entered from the palate at the opening rendered atmospheric adhesion very imperfect. Upon coming under my hands, I found him very adverse to submit to a plaster impression being taken, as he told me he nearly lost his life from such a proceeding a short time before. The plaster became set in the fissure, and it took a medical gentleman three days to cut it out. To prevent the possibility of a recurrence of such an accident, I closed up the orifice in the palate with Stent's composition, so manipulating it as to allow it to remain *in situ* whilst the impression was taken, but also to permit it to be withdrawn with the plaster ; and in this way I obtained an admirable model of the upper jaw, which now, *i.e.* at the time it came under my hands, was edentulous. In order to prevent air from entering at the orifice made by the bullet, and thus preventing suction, I carried a vulcanite stud through the same, to which was attached a soft rubber washer covering the nasal surface of the orifice. From the first, suction was perfect and articulation quite distinct, and my patient, I am happy to say, expresses himself in terms of the greatest satisfaction and gratitude.

Mr. OAKLEY COLES said that when he had to take a cast in



a case of perforation of the palate he always covered the plaster in the neighbourhood of the aperture with a piece of goldbeaters' skin. This being very soft and pliable, a good impression of the margin of the opening could be obtained, whilst it effectually prevented the plaster from getting into the nose and causing the serious annoyance to which the Egyptian patient had been subjected.

Dr. MORISON said that whilst talking to Mr. Charles Tomes a few days previously, that gentleman mentioned that he used shellac for root-fillings. Dr. Morison thought this objectionable, because it was impossible to tell where you were forcing the lac. The object was to close the apex of the root-canal, but you might not send the lac far enough, or you might force it into the cancellous tissue beyond, and in either case the result might be unsatisfactory. He himself, together with many other practitioners in America, always used fine soft gold wire for the purpose. The thickness of the wire must be carefully adapted to the size of the root-canal. Having selected what seemed to be a suitable size, he fixed a length in a holder made for the purpose, and passed it into the canal. A little practice enabled one to judge how far it ought to go; if it did not go far enough, a touch of the file might be sufficient to make it fit; whilst if it passed beyond the apex, a peculiar sensation was felt, and the wire must be withdrawn and replaced by a larger size. If it seemed to fit properly, he withdrew it, notched it about a quarter of an inch from the tip with a sharp file, heated it, and dipped it into liquid guttapercha or thin osteo. He then passed it again into the canal, and gave the holder a tap with a mallet: if it now passed too far, it could be withdrawn; but if it held firmly, a twist of the holder divided the wire at the notch, and the apex of the canal was securely closed. He then filled up the rest of the canal with osteo. He felt sure, from the satisfactory results which he had obtained from this plan, that the cause of the trouble which often followed root-filling must be due to imperfect closure of the canal.

Mr. WEISS exhibited a model taken from the patient whose case he had related at the last meeting of the Society. The left lateral incisor had been transplanted into the place of the right, which was extracted for caries. This took place in August, 1877, and the tooth was still firm and perfectly healthy.

The PRESIDENT then called upon Dr. Field to read his Paper on Gold Fillings.

*On Gold Filling with Cohesive and Non-adhesive Gold.* By DR. FIELD.

As my subject for to-night is a very practical one, I shall treat it in a plain and practical manner by first stating one or two facts, or what appear as such to me; secondly, by giving in detail two or three practical cases of gold filling.

I have been called an extremist, but I do not deserve the title; for I do not confine myself to the use of either soft or cohesive gold exclusively, and am far from being a supporter of the *new* Departure, so called. I am willing it should go upon record, that if called upon to choose between soft and cohesive gold, the latter should be my choice, for with it alone more teeth may be saved and restored to usefulness in these modern times and modern teeth. With the generations past and passing, soft gold did a noble work, operators doing their very best under the most favourable conditions. But with conditions totally unlike, in the rising generation, co-hesion is slowly but steadily coming to the front, and must inevitably prove itself the material of the future.

The avowed object of our speciality is the



conservation of the dental organs by the best known means, and the conscientious selection of a remedy for each case, as the physician selects his remedy.

If this course be followed, we shall never have recourse to the forceps as the easiest way out of a difficulty (except as a *dernier ressort*) : this was the practice of our forefathers, and they were justified in it, for they practised according to their light ; but “ what was good enough for them ” should not be accepted by us as too good to be improved upon.

In the proper filling of teeth, the skill requisite for the successful manipulation of the material, whatever that material may be, the delicacy of touch called for in working upon the living tissue or tissues, gives ample opportunity for the display of professional skill and artistic taste ; but a desire to make such display of skill and taste should be tempered and modified by a thorough and conscientious appreciation of our duty to the patient, *i.e.* to secure by the best possible means the greatest practical result.

As I have already intimated, this may sometimes be best accomplished by the use of gold, and frequently by plastic material. To-night I shall speak of gold only.

Our first imperative need, with any material, is solid foundations and supports, viz. enamel or

dentine without flaw, and in no degree weakened by partial disintegration.

Let us prepare and fill two or three practical cases : 1st, a crown cavity in molar, with cylinders. This cavity will not receive the handle of the excavator, but is only discovered by the use of a Perry's explorer. The attention of the patient has been called to it by a slight pain while masticating ; "only an occasional pain, you know." With a keen-edged excavator, or chisel and mallet, we cut away the enamel edges of central depression, as indicated by the dark lines, or slightly discoloured enamel, and we find that which to the untrained eye was only a discoloured fissure, is the mouth of a cavity in which the enamel is underlaid by softened dentine, generally in the directions indicated by the fissures, and forming when prepared for filling a crucial-shaped cavity.

I am aware that it has been the practice of many good operators to make only a simple round hole in central depression, and fill, leaving the terminal ends of fissures untouched. It is true that in some of the best teeth, *i.e.* those of flint-like density of enamel and dentine, such fillings have done excellent service ; but, as I have already hinted, we now see but few teeth having that class of tooth-substance ; and in the teeth of this generation to leave such fissures unfilled is to leave canals, leading directly to the base of the

filling, which will inevitably undermine the best work, but so secretly that in many cases the pulp may be involved before the danger is manifest.

Having by the use of the chisel exposed the cavity, we will cut to the required depth with a drill in the dental engine, and follow this with a square-end fissure burr to secure vertical walls, and a flat base to cavity.

If at this stage of the preparation we should examine the enamel margins with a glass, they would present a very rough, ragged appearance. As I believe that these ragged enamel edges may account for many failures, we shall polish the margins of cavity by the use of a fine-cut finishing burr, and a stick with emery powder, both to be used in the engine.

Having now a cavity with strong vertical walls, and polished enamel edges, we shall proceed to fill it with gold in cylinder form.

As I am opposed to submerged operations, we shall employ every means to secure a dry cavity. In this, a simple case, the rubber dam, a boon to dentists, is not a necessity, as perfect immunity from the danger of flooding may be obtained by the use of a bibulous paper pad over the mouth of the parotid duct, Dr. Claude Rogers' shield and tongue-holder clamp attached to the tooth, and the saliva-ejector made by the same gentleman. These last-named instruments are indispensable



to every dentist. We are now ready to introduce the gold, and shall make use of Williams's new style B cylinder, made of non-cohesive, smooth surface foil—as well made as the best hand-made cylinders—and the folds of gold will slide upon each other without breaking.

This being a narrow cavity, we select a cylinder of proper length, and of a diameter to fill the posterior arm of cavity, carrying it well home with the foil-carriers, and condensing with the Kirby Pneumatic. This instrument is an invaluable aid in all gold work, but especially so in cylinder fillings. It will condense very large cylinders, or it may be used to place the gold securely against most delicate walls. I have contrived a simple arrangement by which the force of the blow may be adjusted with great nicety, and not interfere with the prompt and rapid action of the plunger. The posterior arm of cavity is filled by successive cylinders, condensed as was the first. To fill the lingual arm is more difficult, *i.e.* with the ordinary points, as is also the labial or buccal arm; but with points called R and L corkscrew foot instrument, the operation is made an easy one. These two arms are, like the first, filled flush with the central space; thus leaving only the anterior arm open; and this appears as a continuation of central space or cavity left after filling the three arms. Place two

cylinders in this centre, condense, and then fill anterior arm as the others, until there remains but a small pit, which may be filled with adhesive foil to act as a key to the filling.

The lateral pressure has been so uniformly hard that no surface-condensing will be found necessary, but we may proceed to cut away surplus gold by the use of finishing burrs, corundum disks, and polish with rubber wheel and emery, and we have a filling which has occupied but a short time, with no canals left to undermine it, and one that no hand-pressure can surpass.

I have frequently been asked by students, "How should you fill a cavity in the distal surface of a molar?"

This certainly is a very difficult cavity as ordinarily prepared, to successfully fill with any material.

The first step is to remove all suspicious marginal enamel, and as in the majority of this class of cavities, caries has made considerable progress before the mischief is detected, one usually finds the coronal enamel undermined, and proportionately weakened. On this account I should cut away this enamel as well, and thus give free access to the cavity.

After thus roughly outlining the limits of cavity, should I find its walls to be in very close proximity to the neighbouring tooth, I should fill

cavity with cotton and sandarach, and dismiss the patient for two or three days, leaving the dressing to act as a wedge to separate the approximating surfaces.

Space in such cases is of the first importance.

In the final preparation of the cavity, cut away doubtful dentine (*i.e.* all that is not up to the A 1 standard of the quality of tooth being operated upon) in every direction, save over the pulp, where for its protection all that is not softened and pasty may be left, as it is the best possible nerve-cap. When disintegration of the dentine has progressed so far as to suggest the necessity of protecting the pulp from thermal changes, I have found court plaster to be as efficient and as easy of application as anything yet tried.

To return to the enamel margins. We must cut away all enamel which is unsupported by live dentine (except in the teeth of the first class, having the dense flint-like enamel), and bevel the edges slightly outwards.

At the cervical margin we must cut away (it is imperative to do so) until we reach sound dentine, which will stand the closest tests of strong light, sharp instruments, and a magnifying-glass. We must never say "I think that will do"; we must know; for failure at this point is a failure of the whole.

With the aid of the magnifying-glass and a strong



light we may frequently detect a very fine white line extending across the cervical wall of dentine and enamel; early failure of our filling will be the penalty if we cease to cut until this mere hair-line of a defect is completely removed. After such cutting it is of necessity to remove the thin wedge-shaped scale of cervical enamel; in that case the buccal and lingual edges, together with the exposed dentine, must be thoroughly polished. We are now ready for the smoothing of the margins of cavity, as before described. This being quickly accomplished, thanks to the engine, we proceed to prepare the cavity to retain cohesive gold.

With a very small drill I make a starting-point both in the buccal and lingual corners of cervical wall. This is merely a shallow flat-bottom *starting-point*, as distinguished from a retaining-point, for we profess to retain our gold by contact. We also cut a very slight groove in the two vertical walls with a fine fissure burr from these starting-points to the crown; in many cases a mere scratch with a diamond excavator suffices.

After adjusting the rubber-dam over at least four teeth, we are ready for the gold, which has been prepared by an assistant. It is Kearsing's cohesive gold, which I believe to be the most cohesive, and uniformly so, now made; R. S. Williams' stands next. Two sheets of No. 4 are

folded twice, or cut into narrow strips two to four lines wide, about an inch in length.

With a mouth-glass and one of "Ambler's assistants" in one hand, and Webb's electric plugger in the other, we introduce, and most thoroughly condense the gold into the starting-points and across the cervical wall; thus connecting these points, and forming the base of our filling. The gold is carried out to, and over the edge of cervical wall, and by a delicate application of the electric plugger is cut smoothly off even with the margin, thus leaving no overhanging edges of gold to annoy us in the finishing. To avoid injury to the enamel or dentine margins, care must be exercised to prevent the plugger-point coming into contact with them—always have gold intervening. Having a solid foundation, the cervical margin well covered, nothing remains but to build up the entire cavity, always exercising the same care as to contact of instrument with enamel, and to force the gold into direct contact with the walls. It is now a question of time and patience merely. An assistant may anneal the gold, and place it in the cavity, by which the time of the operation will be shortened about one-fourth.

The finishing of this class of fillings is not the least important part of the operation. Before removing the dam, we pass a safe-sided file between filling and the adjoining tooth. This is necessary

only when the gold has been built in contact with the next tooth. The file is to be followed by a keen-edged cutting instrument, like a right-angled Howe's scaler : with this we remove overhanging edges of gold, if any. There are various forms of double and finishing files, which are most useful in finishing the edges, also a dental engine file-carrier.

The next step is to secure, by the use of emery-cloth, slips of different width and different degrees of fineness, No. 0 first, followed by No. 00, to secure a uniform surface of the gold, and to make it flush with the margins of the cavity.

For the final polish either linen tape with crocus or rouge, or the soft rubber disk with the same powder, may be used. The approximal surface is thus finished, while the crown is to be finished in the usual manner, with burrs, corundum, &c.

After all this labour one may say, "*le jeu n'en vaut pas la chandelle*," to which I should answer, that the satisfaction of having restored to a state of usefulness equal to the original, a tooth that was almost useless, and perhaps already condemned to the forceps—this makes the sometimes painful and tedious operation well worth all its cost. Such a cavity may be filled with amalgam ; but believing as I do that gold is the best material, on account of its non-shrinkage, its quality



of cohesion,—thereby capable of being made as one piece,—its clean, bright colour, I should never use the former except as a necessity. As to the difference of time and pains between gold and amalgam, both properly introduced, the latter would have little in its favour, while the best results with either or any material may not be accomplished, except one possess the skill and ability to practise our speciality as a speciality in a “skilful and efficient manner.” We are told that such fillings fail; so they do, and patients die after amputation; but an occasional failure of a filling of this class does not condemn the operation any more than does the occasional death from the effects of amputation, or other surgical operation, condemn such operations.

Even after a failure the tooth can still be successfully filled. Again, such a filling to be durable must be perfect; for, owing to its peculiar shape and position, it is subjected to a very severe test in the process of mastication, and a weak point will soon be made manifest by the falling out *en masse* of the gold; while an amalgam, or soft gold filling, forced into a cavity of considerably larger internal dimensions than described by the margin of orifice, cannot fall out, even though defective, until decay has made such ravages that the enamel, having no support, crushes in, and then shows the tooth to be in an almost hopeless state—

almost, I say, because there is still hope, for even on such a tooth, by the use of cohesive gold, a useful member may be built up.

We should have fewer failures if we better understood the capabilities of the material to be wrought with, and examined more thoroughly the tissue we have had to build upon and against.

Even after we have done our best, and have as a result a perfect operation, so to speak, it may fail within an unreasonably short period, and from no other fault than the uncleanly habits of the patient. Perhaps we have failed to impress upon him the importance of the brush and the tooth-pick, by anything more positive than the conventional, "You must brush your teeth," conventionally uttered.

This tooth just filled was once a strong, sound organ, and in spite of this it has been nearly destroyed by caries. We have restored the original contour of its lost parts, and except we can change the conditions which favoured its decay, for opposite conditions, that is, uncleanliness for cleanliness of the oral cavity, caries will again attack the teeth, and a so-called *failure* is the result. Had this patient been properly instructed how, not merely to brush the teeth, but to *clean* them, and shown the best means of accomplishing it, and had he been informed as well of the absolute necessity of perfect cleanliness of the teeth—in a word, if

we pursued any systematic prophylactic treatment in our practice, this cavity could have been prevented.

That few practise this farther than to say, "Brush your teeth twice a day," without a thought as to whether or not the instructions are heeded,—we have frequent evidence, and painful to witness. But I am wandering.

From my own limited experience and observation, the practical deductions which I think may be drawn from this too practical paper are three :—

First, that cavities with strong walls may be quickly and most thoroughly filled with cylinders. Second, that cohesive gold is the best material in proportion as the walls are weak and need support ; and third, where a contour is desirable, or where the cavity extends below the margin of the gums.



## DISCUSSION.

The PRESIDENT said Dr. Field had spoken of his paper as being "too practical"; this could not be. The subject was an eminently practical one, and of vital importance, and it could only be satisfactorily dealt with in the way Dr. Field had chosen. Coming from one who had had such large experience of gold plugging, the paper was especially valuable, and the best thanks of the Society were due to Dr. Field for it. The only criticism he felt disposed to make was that Dr. Field appeared to make rather light of some of the difficulties incidental to gold filling. How, for instance, did he get rid of the sensibility of the cervical margin?

Mr. COLEMAN said he gave his opinion with some diffidence, since there were several members and visitors present who had had larger experience of gold fillings than himself. He felt satisfied that large gold fillings must be done with adhesive gold, and with scrupulous care. With this material it was possible so to adjust the pressure as not to bear unduly upon weak walls; with non-cohesive gold the success was in proportion to the size of the cavity. He thought that perhaps gold was now not as frequently used as it might be. At one time it was the only filling known, and was used for all cases, suitable or not; now we seemed to be in some danger of going to the other extreme. Amongst the numerous substitutes which had been and were now being from time to time discovered, the good qualities of gold were apt to be overlooked, and he thought they were indebted to those who, like Dr. Field, occasionally called their attention to the importance of this form of work.

Mr. HUTCHINSON said that in Dr. Field's description of the

filling of a surface-cavity he had not clearly understood his mode of filling the anterior or mesial arm ; as this was the point at which failure was most likely to occur, he should be glad if Dr. Field would explain that part of the operation a little more fully. With reference to contour work, he should be glad if Dr. Field could inform him how long a crown built up with separate pieces of cohesive gold, and secured by retaining screws, would last.

Mr. READ asked Dr. Field what he had found the most convenient form of wedge for separating the teeth? He had the greatest difficulty in some cases in finding a material which would act efficiently without causing intolerable pain to the patient.

Mr. MOON asked Dr. Field whether he did not find that it was necessary to sacrifice a good deal of the tooth in order to use the electric mallet. In dealing with a front upper tooth, for instance, it would be necessary to cut away the labial enamel, and he thought it was a pity to do this if by any means it could be avoided. The exhibition of cryselephantine work thus set up might be a lasting proof of the skill of the dentist, but he did not think it was becoming to the patient.

Dr. FIELD said, in answer to the President's question, that he had found that the sensibility of the cervical margin was greatly lessened by the use of the rubber dam ; the dam must, however, be thoroughly well fitted—the presence of moisture from a slight leakage brought back the sensitiveness. If this was not sufficient, he applied a crystal of carbolic acid, and in very sensitive subjects it might be necessary to repeat the application several times. He thought he had described the filling of the anterior arm of the surface cavity sufficiently fully in his paper ; it was filled last with a straight foot instrument. It was important to see that the walls of the mesial extremity were vertical. It was difficult to answer Mr. Hutchinson's second question off-hand. He had practised for some years in the United States, then in Geneva, and lastly in London, so that he had been unable to keep many of his cases in view for

long. But it so happened that a gentleman for whom he had built up a gold molar six years ago in Geneva had lately called upon him, and the work was still perfect. In answer to Mr. Read, he would reply that he used all sorts of materials for wedges : hard wood, soft wood, rubber, cotton wool, floss silk, &c., but he did find that some patients were extremely sensitive to the operation in whatever way it was done. Lastly, in answer to Mr. Moon, he would say that in filling teeth with cohesive gold it was absolutely necessary to cut away all weak parts. If the labial enamel was undermined, he should not hesitate to cut it away. The appearance of the patient must not be studied to the extent of risking the success of the operation, and perhaps the loss of the tooth.

The usual vote of thanks was then proposed from the chair, and carried unanimously.

The Meeting then terminated.





## ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.



The following applications for Membership have been received by the Council :—

GEORGE WILLIAM PARKINSON, M.R.C.S. Eng., 36, Sackville Street, London, Resident.

FRANCIS EWBANK, M.R.C.S., L.S.A., Harvard College, U.S., 19, Savile Row, Resident.

ADAM TAYLOR, Indian Army, Medical Department, Civil Surgeon, Peshawur, India, Non-resident.





## ORDINARY MONTHLY MEETING,

*May 5th, 1879.*

EDWIN SAUNDERS, Esq., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting having been read and confirmed,

Mr. ARTHUR UNDERWOOD signed the Obligation Book, and was formally admitted to Membership by the President.

The following gentlemen were then balloted for and elected Members of the Society :—

Mr. EDWARD KEEN, King's Parade, Cambridge, Non-resident.

Mr. JOHN ROBERT GOEPEL, Mount Pleasant, Liverpool, Non-resident.

The PRESIDENT announced that the following candidates had been duly nominated, and would be balloted for at a subsequent meeting :—

Mr. ROBERT WALLER, Cairo, Corresponding Member.

THOS. CLEMENTS, 2, Colville Road, Bayswater, Resident.

CHAS. JAMES NOBLE, L.D.S., R.C.S. Eng., 1, Drayton Terrace, South Kensington.

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The PRESIDENT also announced that an illustrated monograph, in German, "On the Atmospheric Treatment of Diseased Pulps," by Adolph Witzel, had been sent from Berlin, as a contribution to the library, through the agency of Messrs. Ash.

Mr. COLEMAN then related the following interesting case, which he believed to be almost a unique example of impacted fracture of a tooth. A young gentleman, now 17 years of age, had a fall, at Malvern, when twelve years old, chipping, but not exposing, the pulp of his right upper central incisor. The tooth, however, gave him no inconvenience until a few months since, when he began to suffer some pain, and applied to a dental practitioner in consequence. As the front teeth were not at all crowded, this gentleman very properly advised that the incisor should be retained if possible. He therefore drilled a hole through the posterior wall of the tooth, cleared out the pulp-cavity, introduced some cotton wool soaked in an antiseptic solution, and closed the aperture with gutta-percha. As this did not afford much relief, the patient applied to Mr. Woodhouse, who also counselled patience; but as the tooth became more painful, the patient again called upon Mr. Woodhouse, and, finding him out of town, came to Mr. Coleman. Mr. Coleman found that there was by this time clear evidence of severe periostitis and alveolar abscess, and as there now seemed to be no prospect of saving the tooth, he, with the patient's ready consent, and Mr. Woodhouse's full concurrence, proceeded to extract it; but on applying the forceps, the crown alone came away. At first he thought that the fang might have been absorbed; but on looking into the alveolus the top of the fang could be seen, and it was easily extracted. It then became evident that the case had been one of impacted fracture, but the crown and the fang had been so dovetailed together that, notwithstanding the repeated examinations, drilling, &c., the real nature of the injury had never been discovered. Mr. Coleman had, indeed, noticed that the tooth felt loose, but scarcely more so than might have been accounted for by the amount of alveolar inflammation which was present. It seemed a little remarkable that, during the long period which had elapsed since the injury, no attempt at repair should have taken place. Apparently no case could have been more favourable for reunion which has occurred under similar conditions. The probable explanation was, that the pulp had been so far

injured at the time of the accident as to destroy its vitality, and under these conditions a uniting medium, he believed even of cementum, could not be furnished; otherwise he might have been able to exhibit a companion to the unique specimen of union of a fractured tooth which was now in the possession of the President.

Mr. MOON said he also had a case to bring forward, which showed how satisfactorily teeth might behave after being subjected to very considerable violence. On April 25th, as he was leaving the hospital, he was asked to see a man who had just been brought in. He was a workman at Messrs. Broadwood's pianoforte factory. Whilst helping to bend a plank, some of the men let go, and the wood springing up struck him a violent blow under the chin. When seen by Mr. Moon, the state of things appeared to be as follows:—The right upper canine was driven inwards, so that its point lay inside the lower canine; the right lateral incisor appeared to be broken off level with the gum; the right central was very loose, and the left central apparently fractured obliquely across the crown. The alveolar plate was driven outwards, and the gums were bleeding and much swollen, rendering a thorough examination very painful and difficult. Being pressed for time, Mr. Moon left the treatment of the case to Mr. Lawrence Reed, then House Surgeon, and was agreeably surprised to find, when he again saw the patient a week later, that all four teeth were *in situ*. As this satisfactory result was entirely due to Mr. Reed's judicious treatment, he would leave him to relate the further progress of the case.

Mr. REED said that the members would have guessed, after what Mr. Moon had stated, that the teeth were not really broken, but had been driven up through the transverse plates of the superior maxilla, and almost through the floor of the nares. He first drew out the canine into its proper position, and then, with fine forceps, carefully drew down the incisors. The lateral incisor was so loose that it was with difficulty kept in place. He took it out of the mouth, but finding it perfect



immediately replaced it. He then secured the teeth in position by a platina wire, extending from the first molar on the one side to the second bicuspid on the other, tying each tooth within that space to the wire with soft silk. He then gave the patient a wash for the mouth, told him to use the teeth as gently as possible, and to return the next day. Since then the case had progressed very favourably, the swelling subsided, and the teeth gradually became fixed. The only doubt was as to the ultimate progress of the case: although none of the pulps had been exposed, still their connections at the apex of the fang must have been destroyed, and it seemed doubtful whether these would be re-established, or whether death of the pulp would occur. He thought it would probably be necessary to open the pulp-chambers and to clear out their contents. A favourable point in the case was that the patient was young and remarkably healthy.

The patient was then introduced and examined by most of those present.

Mr. COLEMAN said that, although the result in this case appeared to be very satisfactory, he had a strong opinion that the use of ligatures under such circumstances was very rarely necessary, and was always more or less injurious. If in an ordinary case of replantation the tooth be examined about twenty-four hours after the operation, it would be found to have become looser and to be raised above the level of its neighbours. This was due to the fact that an effusion of lymph had taken place into the socket round the roots of the tooth; and this lymph played a very important part in the subsequent progress of the case. The fluid part was gradually absorbed, and the rest became organized to form the tissue of union. But if the tooth were firmly tied down in its socket, this effusion was prevented or greatly impeded; and he believed, therefore, that the risk of failure was directly proportionate to the efficiency of the ligature. In cases of fracture of the alveolus a ligature was necessary, but not in an ordinary case of replantation.

Mr. HUTCHINSON asked whether Mr. Coleman would dispense with the use of plates as well as ligatures.

Mr. COLEMAN said, yes; in most cases he thought the patient's own feelings were sufficient to protect the tooth. In some cases the use of a plate to raise the bite was advisable; but he considered it decidedly injurious to tie the tooth down in a fixed position.

Mr. HUTCHINSON said he had listened to Mr. Coleman's observations with great interest, for he had long entertained similar opinions, and had refrained from using ligatures whenever their use could possibly be avoided. The following case would serve as an example of the mode of treatment he had found most satisfactory. A gentleman was thrown from his horse whilst hunting, and knocked out two of his upper front teeth, the right lateral and central incisors being completely detached from their sockets, whilst the left central was adherent only by some shreds of membrane. He replaced the loose teeth as well as he could, and then fitted a splint of Stent's composition capping all the teeth, back as well as front. By making the patient bite upon this, and adding fresh material little by little over the loose teeth, these were gradually pushed back into their proper level. He left this splint in the mouth for twenty-four hours, and then replaced it by one of vulcanite, which capped the back teeth only, and made just thick enough to protect the front teeth from any pressure when the jaws were closed. The patient wore this for a fortnight, by which time the displaced incisors had become firm and fit for use. During the past winter he had treated another case in a precisely similar manner, and with equally satisfactory results. A young lady fell on the ice while skating, breaking off her right upper central, and driving the other backwards into the jaw. He drew this tooth into line with his fingers, used no ligature, but protected it from pressure by capping it and the back teeth. The splint was worn three weeks, by which time the left central had become firm and useful; the right was then pivoted. The advantage of this plan was that the vulcanite

plate acted like a surgical splint on an ordinary fracture, protecting the teeth from all risk of displacement, but exerting no pressure.

Mr. MOON said it would have been impossible to have returned the teeth in Mr. Reed's case without using a ligature ; the right lateral especially had to be held in position until it had been fastened to the wire.

Mr. DAVID HEPBURN showed, for Mr. J. F. Corbett, of Cork, the lower central incisors (permanent) of a girl, 8 years old, remarkable for their exceedingly small size. The laterals were well developed, and all the other teeth quite normal. Mr. Corbett removed the diminutive centrals, and purposed bringing the laterals together.

Mr. KIRBY (of Bedford) showed several contrivances which he had been in the habit of using in his practice, and had found valuable. (1.) A tongue-holder, with tubular stem, for use with any kind of saliva-ejector. It was small, and out of the way in operating ; with the addition of a pad in the cheek it enabled one to do a long operation without any inconvenience from moisture. He had been in the habit of using with this an aspirator, made on the principle of Sprangel's pump, *i.e.*, similar to Mr. Claude Rogers's apparatus, but connected with a spittoon, so that it did not occupy any extra space. A pint of water in the glass globe which surmounted the apparatus would keep the ejector in action for more than an hour. (2.) A shield made on a plan suggested, he thought, by Dr. Orphoot, to which a weight was attached for the purpose of retaining it in place. The weight could be placed under the chin, or turned to the right or left so as to balance the shield in any required position. (3.) Whilst speaking of keeping the mouth dry, he would show a material which he had for many years found most useful. It was called mull muslin. He kept it prepared in bandage-like strips, and cut off a piece as required ; this, when rolled up, formed a most convenient pad to place under the cheek. He also kept a larger size for wrapping round spiral springs, and found it most useful in operating on



either jaw. (4.) He was also anxious to bring before the Society a new oblique point, which could be used with several kinds of automatic mallets ; it was so small as to be available for any cavity, and gave what he had long considered a great desideratum,—a blow from behind forwards. He had always protested against the use of curved points for mallet instruments, for he had found by experiment that a comparatively slight curve would take off all the force of the blow, so that, although the operator thought he was hammering away most effectually, the result was only noise, and bad, soft, unsound work. He himself preferred the finger lever mallet, and had brought one to show the new point in action. He had also attached one to a pneumatic mallet. It would be observed that his pneumatic instrument had the ball replaced by a very simple form of cylinder, which gave rather a quicker repeating action, and was less fatiguing to work, as the foot was not raised so far off the ground.

Mr. OAKLEY COLES then showed, for Mr. Harris, of Finsbury Place, City, a new form of detachable spring and swivel. The advantages claimed for Mr. Harris for this spring and swivel are :—

- a.* The solidity of pin and spring.
- b.* The closeness of adjustment of swivel and pin to surface of molar block.
- c.* The easy change to any angle.
- d.* Perfect safety, and quick renewal of new spring.

Mr. KIRBY said he had almost given up the use of springs. During the last four years he had only used them in one case, and then solely because the patient desired it. When additional stability was required, he preferred to have the lower molars cast in solid gold. It might be thought that this would make the plate uncomfortably heavy, but, as a fact, the weight was less than when springs were used. In an upper denture additional firmness could be obtained by cutting ridges on the sides of the palate so as to press it into the soft palate.

*On Nicotine, and its Action upon the Teeth.*

By DAVID HEPBURN.

MR. PRESIDENT AND GENTLEMEN,

I will occupy your time but for a few minutes this evening, in laying before you a short communication on “Nicotine and its Effects on the Teeth.” I have been led to do so by the oft-repeated query of patients as to whether or not the practice of smoking is deleterious to the organs of mastication, and I hope my few remarks may elicit your experiences upon this by no means unimportant question.

Notwithstanding the sweeping condemnation of the use of tobacco given by King James I. in his “Counterblaste,” in which he describes it as “a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black, stinking fume thereof nearest resembling the horrible Stygian smoke of the pit that is bottomless,” the practice of smoking has increased up to the present day, and we find it employed as a universal luxury alike among civilized and savage nations. Snuff-taking has of late years decreased, chewing and smoking being more frequently indulged in. The former habit is, amongst our countrymen, chiefly confined to sailors; but in America I believe it is

more universal. Although a distinct poison, the system, in the majority of instances, soon becomes tolerant of the action of tobacco, and a remarkable instance is quoted by Dr. Arnott, in an old volume of the *Lancet*, which shows the enormous amount capable of being consumed, after prolonged practice, without creating apparent constitutional disturbance. The case was that of a sailor, aged 64, in the almost uninterrupted enjoyment of good health, who had chewed tobacco for upwards of fifty years, also eating it. For many years in the later part of his life he was in the constant practice of "eating a quarter of a pound of the strongest negrohead every five days."

Taken internally, or inhaled in the form of smoke, the action of tobacco is that of a sedative and depressant; and in the unaccustomed, nausea is frequently produced. As a rule, however, a few trials will render the system tolerant of the poison, and when used in moderation it promotes regular action of the bowels, and soothes nervous irritation.

From a medical point of view it is interesting from the fact that it finds a place in the Pharmacopœia, but as a therapeutical agent it has been superseded by chloroform. In former times, however, an enema of tobacco was in rare cases prescribed, but great danger attended its adminis-



tration. In this form it was capable of producing great muscular relaxation when that condition was necessary, as, for instance, in cases of strangulated hernia. *Nicotiana tabacum*, or Virginian tobacco, is classed in company with many of our most deadly poisons,—hyoscyamus, belladonna, and stramonium, in the natural order Solanaceæ; and it must not be confounded with Indian tobacco, or *Lobelia inflata*, of which there are two officinal preparations in the Pharmacopœia (*Tinctura lobeliæ* and *Tinctura lobeliæ ætherea*), although they have much in common in their action upon the system.

The deadly nature of the alkaloid contained in tobacco may be seen from a quotation of the two following cases, in which death resulted from the administration of the drug. The first occurred in Belgium in 1851. An individual, it appears, studied chemistry with a view to the preparation of the alkaloid nicotine. He administered the poison to his brother-in-law, and the victim succumbed in five minutes. The other case occurred in London in 1858: in this the act was suicidal, and death was quite as rapid. It is said that the unfortunate individual, who was a chemist of rising reputation, was observed to stare wildly, and heaving a deep sigh died without convulsion. In addition, fatal results have followed its employment as an enema, and symptoms of an alarming

nature have followed the inhalation of smoke, sleeping surrounded by bales of the weed, and even from carrying it next the skin, a practice which has been resorted to by smugglers.

From all parts of the tobacco plant, a liquid volatile alkaloid, *nicotina*, can be obtained. This nicotine when pure occurs as a colourless volatile oil, but on exposure to the air it becomes yellow, and this tint deepens by keeping. The taste is acrid, and the odour is described as "pleasant and ethereal." In this alkaloid is found the source of activity of the tobacco plant.

Nicotine is soluble in water, alcohol, and ether, and neutralizes acids. The analysis of tobacco smoke is of importance to us in considering this question. It is said to contain a certain amount of watery vapour. Ammonia is also present, and it is this which gives to the smoke an alkaline reaction. Next we have carbonic acid, to which Dr. Richardson has attributed much of the sleepiness and lassitude which follows prolonged inhalation of tobacco fumes. Further, it is stated that a certain amount of free carbon is always present. Lastly, we find the oil of tobacco which contains nicotine (the alkaloid), a volatile substance possessing a characteristic odour, and a dark resinous extract having a peculiar bitter taste. The quantity of this oil which is taken in at each inhalation of smoke may be easily seen by the old

experiment of quickly *exhaling* a puff of smoke through a handkerchief stretched over the orifice of the mouth.

I have thus briefly enumerated some of the characteristics of this agent, which is so largely in use at the present day, and which, both in its secondary and direct effects, must act in a marked way upon the teeth of individuals who indulge in the practice of smoking. Of its secondary effects there is little to be said, save that in the fully matured, where the constitution has been impaired by the excessive use of tobacco, the result to the teeth will probably be similar to that produced by any other influence tending to derange the bodily health;—a subject too wide to enter upon on this occasion. Smoking, when indulged in before complete maturity, when the vitality of the teeth is peculiarly active in completing the structures of which they are composed, must exercise a most deleterious influence upon these organs, and favour the development of decay. Consequently, what I may say of the direct action of nicotine on teeth, I intend only to apply where growth is complete.

From the slight observation I have given to this subject, I am led to believe that the direct action of nicotine upon the teeth is decidedly beneficial. The alkalinity of the smoke must necessarily neutralize any acid secretion which



may be present in the oral cavity, and the antiseptic property of the nicotine tends to arrest any putrefactive changes which may be going on in carious cavities. But, in addition to these, we have another agent at work in the carbon with which tobacco smoke is impregnated, and I am inclined to believe that the dark deposit which we find on the teeth of some habitual smokers is largely composed of this ingredient.

It is this carbon which is deposited upon the back part of the throat and lining membrane of the bronchial tubes; and with whatever disastrous effect it may act in these situations, from what we know of its wonderful antiseptic properties, I think we are justified in concluding that its action upon the teeth must be of a beneficial nature. Moreover, we find this deposit takes place exactly in those positions where caries is most likely to arise, and on those surfaces of the teeth which escape the ordinary cleansing action of the brush. We find it interstitially, in all minute depressions, and filling the fissures on coronal surfaces. It may be removed with scaling instruments from the surface of the enamel, but where it is deposited on dentine, this structure becomes impregnated and stained. Indeed, it is only where the enamel is faulty, and there is access to the dentine, that any true discoloration of the tooth takes place; but it is remarkable how the stain will penetrate

through even minute cracks, provided the necessary attention to cleanliness be not exercised. The staining power of tobacco oil may be seen when a deposit has taken place on the porous surface of tartar collected on the posterior surface of inferior incisors. In this situation a shiny ebony appearance is occasionally produced. That tobacco is capable of allaying, to some extent, the pain of toothache is, I think, true; its effect being due, not only to its narcotizing power, but also to its direct action upon the exposed nerve; and I am inclined to attribute the fact of the comparatively rare occurrence of toothache amongst sailors, in great measure, to their habit of chewing. I have been struck, in the case of one or two confirmed smokers of an exaggerated type who have come under my notice, by the apparent tendency which exists towards the gradual production of complete necrosis of carious teeth, and the various stages of death of the pulp, and death of the periosteum taking place without pain or discomfort to the patient. This condition may, of course, be brought about by a variety of influences; but in these special cases I am inclined to think that the presence of nicotine in the mouth has acted powerfully. Hoping to hear your experiences on this subject of nicotine, and its effects on the teeth, I leave it in your hands.

## DISCUSSION.

The PRESIDENT remarked that Mr. Hepburn had chosen a subject of considerable importance, to which all present must have given some attention. From the title of the paper, "Nicotine, and its Effects on the Teeth," he had expected something rather different. He thought that Mr. Hepburn had been making some experiments with nicotine on diseased pulps, &c., and wished to bring the results before the Society ; however, the paper they had heard was probably more interesting and practical. For the therapeutic value of nicotine was not great, its use being, he believed, restricted, or nearly so, to cases of strychnine poisoning, from its great power of producing muscular relaxation. His own opinion was that when practised in moderation, smoking was not injurious, but if indulged in to excess it was apt to cause chronic irritation of the mucous membrane of the mouth, and might thus injure the teeth indirectly.

Mr. OAKLEY COLES said that although the essential principles produced by the combustion of tobacco might possess antiseptic properties, and thus be useful in some respects, he did not think that smoking was altogether so innocent an amusement as Mr. Hepburn seemed to consider it. He thought that in cases where the enamel was delicate, the rapid changes of temperature might be injurious. When smoking was indulged in out of doors, the teeth were exposed to alternate blasts of hot and cold air. He had noticed that the enamel of smokers' teeth was sometimes cracked all over, and he thought that this might be the cause of it ; he had noticed the same thing also in cooks.



Mr. UNDERWOOD said he had heard it asserted that smoking did not increase the temperature of the mouth.

Mr. HARDING believed that the general opinion was that smoking was not directly injurious to the teeth, but might affect them indirectly by deranging the digestion, or lowering the general health. He had noticed that in the mouths of regular smokers there was a great difference in the amount of the dark deposit to which Mr. Hepburn had referred. Could he account for this? Did it depend on the kind of tobacco smoked?

Mr. ARTHUR UNDERWOOD remarked that although the ammonia in the smoke neutralized the oral secretions for the time, it also acted as a stimulant, and caused increased production both of mucus and saliva. He thought this could scarcely be considered a beneficial effect. He thought also that smoking had a tendency to cause recession of the gums.

Mr. COLEMAN said he had very frequently been pressed to give an answer to the question, "Is smoking injurious to the teeth?" He had formerly held the opinion that it was, but had now changed his mind. He believed that smokers were less liable to caries, and they were certainly less liable to pain. With regard to the preservative effects which Mr. Hepburn had ascribed to nicotine, he had always thought, that although those who chewed tobacco got some amount of nicotine, only a very small amount was given off when the tobacco was burnt.

Mr. KIRBY remarked that in most cases of the destructive distillation of vegetable products, some members of the phenile series (creosote, carbolic acid, &c.) were present in the vapour, and probably this might account for the preservative properties of tobacco smoke. Could Mr. Hepburn say whether creosote or any allied product had been detected in the smoke?

Mr. MOON asked whether Mr. Coles had noticed that cracking of the enamel was not confined to smokers? He had frequently noticed it in patients who did not use tobacco.

One of the most marked cases he had met with was a tailor, and he attributed it to his habit of biting his thread. Since then he had not met with many cases which seemed to be due to this cause.

Mr. CHAS. TOMES asked whether Mr. Coles had noticed that the enamel might be cracked to a very considerable extent without any tendency to caries resulting?

Mr. OAKLEY COLES said he had noticed that cracking of the enamel might occur in persons who did not smoke, but he thought it was more marked in those who did. It might be that it was only more noticeable in smokers because the dark staining of the cracks made them more visible. He was also aware that cracks in the enamel might exist for a long time without the production of caries, provided the teeth were well developed, and his remarks only referred to cases in which the enamel was delicate and friable.

Mr. HEPBURN, in reply, said that he could give no information as to the presence of creosote in tobacco-smoke; he had not seen it mentioned in any analysis. He had seen cracks in the enamel of all sorts of people, and did not think they were caused by smoking, but only that this made them more visible. Nor was it his experience that caries often started from these cracks, unless there was some defect in the dentine as well. At the same time, he was willing to allow that the rapid changes of temperature might be injurious to delicate enamel. He did not think that smoking favoured the deposit of tartar; it was rare for smokers to be troubled with soft tartar: it was generally small in amount, and hard.

The PRESIDENT then proposed the usual vote of thanks to the author of the paper and the contributors of casual communications. This was carried unanimously, and the meeting terminated.









JOHN H.

JOHN H.







# ORDINARY MONTHLY MEETING,

*June 9th, 1879.*

EDWIN SAUNDERS, ESQ., PRESIDENT, IN THE CHAIR.

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THE Minutes of the previous Meeting having been read and confirmed,

THE PRESIDENT announced that the following candidates had been duly nominated, and would be balloted for at a subsequent meeting :—

CHARLES FORAN, Marshfield House, Eastbourne.

GEORGE W. PARKINSON, M.R.C.S., 36, Sackville Street, Piccadilly.

FRANCIS EWBANK, M.R.C.S., L.S.A., 19, Savile Row.

ADAM TAYLOR, M.R.C.S., Civil Surgeon, Indian Medical Service, Peshawur.

The following gentlemen were then balloted for and elected Members of the Society :—

THOS. H. ROBERTS, L.D.S., R.C.S.E., 49, Charlwood Street, Belgrave Road.

EDWARD FOTHERGILL, L.D.S., R.C.S.E., Esq., Newcastle-on-Tyne.

EDWARD GEORGE BETTS, L.D.S., R.C.S.E., Holloway.

CHAS. D. COOKE, M.D., Brooklyn, New York, Non-resident.

GEORGE L. PARMELEE, M.D., D.M.D., Hertford, Connecticut, Non-resident.

GEORGE T. MOFFATT, M.D., D.M.D., Boston, U.S., Non-resident.

The PRESIDENT announced that Mr. Howarth had presented to the Museum an aluminium and rubber denture, which had been worn for fifteen years. The plate had not been struck up, but had been made by pouring melted aluminium into the cast; it had then been trimmed and vulcanized. Notwithstanding the number of years it had been in use it showed no signs of deterioration.

Mr. STORER BENNETT showed a contrivance for twisting malplaced teeth, which he had found very useful. Being very simple, he had no doubt that something similar must have been adopted by others, though he had not been able to find any mention of such an apparatus either in the Society's Transactions or elsewhere. It consisted of a vulcanite plate, in which the rubber was thick behind the tooth to be moved; but cut away immediately behind the part to be drawn in. Through the thick rubber a tunnel was cut, extending from immediately behind the outstanding edge of the offending tooth to the lingual surface of the plate, and deeply countersunk at its posterior extremity. This tunnel was for the reception of a hook made of half-round gold wire; the front of the hook was adjusted to catch on the projecting edge of the tooth, whilst a small "jump ring" was soldered to the other end. The back of the tunnel being countersunk, the ring was protected from irritating the tongue. Two short slits were cut in the free edge of the plate opposite the posterior extremity of the tunnel, and their anterior extremities joined by a shallow groove on the palatine surface of the plate. A small elastic rubber band was drawn into the grooves, and connected with the ring at the back of the hook. No harm could be done to the palate by the elastic band, as it lay in the groove, and was flush with the surface of the plate. By this plan no cumbersome and unsightly apparatus was visible in the front of the mouth. Although the traction was slight at any given time, yet being constant its actual moving power was very great. The teeth were moved but with little pain. It was easy of application; and by giving the patient a few



extra bands, with instructions to change them every few days, many unnecessary visits were avoided.

Mr. CHAS. TOMES exhibited a regulation plate, the invention of Mr. Palmer, of Cheltenham, which he said was one of the simplest and best he had yet met with. Mr. Palmer stated that he had succeeded in getting with this instrument an expansion of the whole arch varying from  $\frac{1}{16}$ th to  $\frac{1}{4}$  inch per month, with very few attendances.

The PRESIDENT then called attention to an apparatus made by Messrs. Winderling, of Milan, which had been sent for exhibition by Mr. C. J. Fox, and which had been designed to facilitate the packing of celluloid and vulcanite. It consisted of a light iron frame ; in the centre of this was a small platform on which the flask rested, raised about four inches from the table. Beneath the platform were two burners for gas or spirit,—one for heating the flask to  $212^{\circ}$  F., the other to heat the celluloid to  $280^{\circ}$  F. A roll of celluloid was placed in a cylinder attached to the face of the flask, and when sufficiently liquefied was forced into it by a piston worked by a screw with lever handles. The advantages claimed for the apparatus were :—First, that the plaster not being heated beyond  $212^{\circ}$  F. remained very hard, so that metal models were not required ; secondly, the case being flaked in one solid body of plaster and never opened, there was very little chance of raising the bite or of displacing any teeth, bands, &c. To obviate the difficulty of removing pieces from the solid block of plaster small brass plates were inserted whilst flaking, in such a manner that the plaster easily separated into pieces on removal from the flask. There being no steam pressure, there was no danger from this source.

Mr. OAKLEY COLES said that, from his experience of the results obtained from other machines which had been designed for the same purpose, he could not help thinking that Mr. Winderling had introduced into this several unnecessary complications. He knew of several already in the market,—for instance,

the machine invented by Mr. Gartrell, of Penzance, and that introduced recently by the Dental Manufacturing Company,—which would complete the process in considerably less than two hours. About twelve years ago a very similar apparatus had been brought before the profession by Mr. Payne, of Great Russell-street, but the results obtained by it were not so satisfactory as those obtained by the ordinary method. He failed to see how raising the bite could be avoided by this process more than in any other ; this was due to the teeth sinking in the plaster, and this would be quite as liable to occur in the apparatus before them as in others with which they were familiar. It was, no doubt, a very ingenious piece of mechanism, and the inventor deserved great credit for having brought it to such perfection ; but it appeared to him too elaborate and complicated, and not likely to give any better results than the simpler processes with which they were already acquainted.

Mr. HUTCHINSON said he had had the advantage of seeing the apparatus worked by Mr. Winderling himself, and he thought it offered more advantages than Mr. Coles had given it credit for. Although complicated in appearance it was really simple enough in structure. In the first place the plaster was never exposed to wet heat, nor above 212° F., and consequently remained very hard, so that it was impossible to squeeze the teeth into the plaster : then the celluloid entered the flask by an aperture only one-sixth the diameter of the piston ; and when full the surplus escaped through three small openings at the back, so that there was no undue pressure on the teeth. And lastly, the uniform temperature at which the celluloid was kept rendered it much less liable to shrinkage. Still further to obviate this tendency, Mr. Winderling advised that the plate should always be kept in cold water when out of the mouth. He asserts that celluloid will never warp so long as it is kept moist.

Mr. COLES asked how it was that Mr. Winderling had come to the conclusion that dry heat was better than moist for

working celluloid ; most experimenters had found steam or oil best to work with.

Mr. WEISS said that he considered the point on which Mr. Winderling appeared to lay so much stress, that of working the celluloid at a temperature not exceeding  $212^{\circ}$ , was itself a great mistake. The great objection to the use of celluloid was its liability to scratch and fray in the mouth. He had found that this liability was greatly diminished by submitting the celluloid to as high a temperature as possible short of destroying its composition. A plate which had been kept for half an hour at a temperature of  $280^{\circ}$  would be found to be much harder and denser in structure than one which had not been heated beyond  $212^{\circ}$ .

Mr. CHARLES TOMES said he could not quite understand how the difference between the diameter of the piston and that of the aperture through which the celluloid was forced could reduce the pressure on the model?

Mr. HUTCHINSON admitted that he had been led into a fallacy on that point, but the three vents to which he had called attention were quite sufficient to prevent the pressure from being excessive.

Mr. TURNER remarked that celluloid often showed a tendency to warp after it had been in use for some time ; was this tendency diminished by Mr. Winderling's process?

The PRESIDENT answered that Mr. Winderling laid great stress on the importance of always keeping the plate moist. He advised that it should be kept in a metal case on a damp sponge, and that care should be taken never to allow it to get dry.

Mr. OAKLEY COLES said that in a paper he had read before the Society about ten years ago he had pointed out that celluloid behaved in this respect very much like bone. Alternate moistening and drying favoured warping ; but if the plate was kept in one state or the other but slight alteration in shape would occur.



Mr. HUTCHINSON showed a mouth mirror illuminated by the electric light, which had been designed by Messrs. Coxeter, of Grafton-street; it was intended for use in dull or foggy weather. It was similar in some respects to that which had been brought forward by M. Trouvé, of Paris, but differed from this in other important particulars. The battery was a "constant" one, producing a direct primary current of great quantity and intensity. No strong acids were used, the power being generated by the action of platinum and peroxide of manganese. The light was obtained in the same manner as Trouvé's, by the incandescence of a short piece of platinum wire, but a rheostat was fixed in the handle by which the passage of the current could be regulated, and to prevent the fusing of the platinum. It would give a steady light for from 20 to 30 minutes. Messrs. Coxeter had also arranged a means of keeping the mirror cool, by passing a current of water round the back of it. The apparatus could also be used for cauterizing.

Mr. COLEMAN said it might be in the recollection of some of the older members that a similar apparatus was exhibited before the Society some years ago. The illumination was more powerful than that which Messrs. Coxeter were now showing, for it enabled one to see through the alveolar process so that the outlines of the fangs of the teeth were distinctly visible. He had not been able to find any notice of it in the Transactions, and could not then call to mind when or by whom it had been shown.

Mr. ROBERT HEPBURN said that the apparatus spoken of by Mr. Coleman was the invention of Mr. Hart, of Edinburgh, a very eminent practical electrician. He remembered its being exhibited about ten years ago, and Mr. Coleman had not exaggerated its capabilities. It was a far more brilliant light than the present.

Mr. OAKLEY COLES said that M. Trouvé's apparatus was intended primarily for use with the laryngoscope, and the great objection to it was that the platinum got melted occasionally

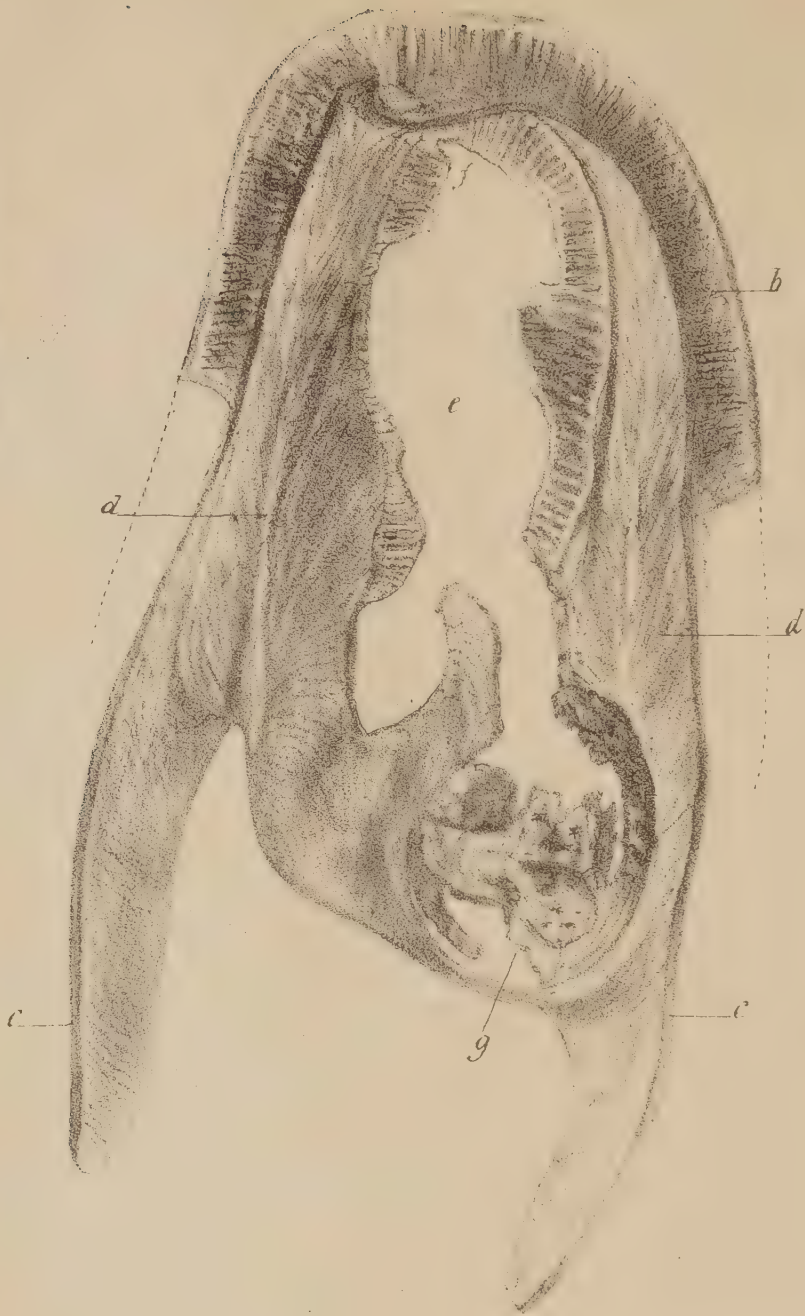


Fig 3.

Fig. 2.



Fig. 1.



- Fig. 1. Supernumerary tooth, natural size.  
 „ 2. Section of same enlarged two diameters to show apparent second tooth contained inside, marked *a*.  
 „ 3. Microscopic Section (Diagramatic).  
*b*. Enamel.

- Fig. 3. *c*. Cementum.  
*d*. Dentine.  
*e*. Cavity lined with enamel communicating at *f* with coronal enamel.  
*g*. Mass of secondary dentine containing well-marked lacunæ and canaliculi.



by the intensity of the current, and the drops of fused metal falling on the vocal cords burnt holes in them. He was glad to see that in Messrs. Coxeter's apparatus this was guarded against, by enclosing the platinum in a glass tube. He knew that of late several individuals had been experimenting with the view of making the electric light available for mouth illumination, and he had no doubt their efforts would ultimately be successful.

Mr. HUTCHINSON showed a supernumerary tooth which he had removed from the mouth of a patient 13 or 14 years of age ; it occupied the place of a permanent lateral. On examining it he found that the root was much expanded and filled with pus, and on washing this out he found what appeared at first sight to be a second tooth inside of it near the apex. The idea struck him that the missing permanent lateral had got shut up inside the supernumerary tooth, though it was difficult to imagine how such a thing would occur. But, on examining the specimen under the microscope, he found that what appeared to be a second tooth was an abnormal dipping down of the superficial enamel. The tooth, although at first simple, was really composed of two denticles, each with a separate pulp cavity. Similar cases were mentioned in Mr. Tomes's work (p. 227, 1st ed.), but they were stated to be very rare.\* Mr. Hutchinson desired to express his indebtedness to the curator for the assistance he had given in preparing and identifying the specimen.

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\* Tomes's "*Dental Surgery*," page 227.—" In some instances the defective tooth is not the subject of any obvious deformity, though it is usually somewhat irregular in shape, and enlarged at some point. The enamel investing the crown may be and often is perfectly well developed ; but we shall find at some point a slight depression, in the centre of which is a small dark spot. If the tooth be divided through its long axis we shall find that the dark centre of the depression is in fact the choked-up orifice of a cavity situated within the substance of the tooth, external however, and perfectly unconnected with the pulp cavity. If the section be a fortunate one, we shall be able to trace the enamel, as it is continued from the exterior of the tooth through the orifice into the cavity, the surface of which is lined more or less completely with this tissue."

Mr. OAKLEY COLES then showed, for Mr. Hatfield, of Old Burlington-street, a large mass of salivary calculus which had been removed from the mouth of a lady about 70 years of age. Before removal it formed one mass, which almost covered three incisors, a canine, and a small bicuspid stump. It was supposed to have been in course of formation for about two years.

The PRESIDENT then called upon Mr. ARTHUR UNDERWOOD to read his paper, "On the Functions of the Nerves of Taste."

*On the Functions of the Nerves of Taste.*

MR. PRESIDENT AND GENTLEMEN,

My interest has been aroused concerning the subject upon which I have the honour to address you to-night by a paper upon the question forwarded to me some months ago from Dublin.

The author, Dr. Nixon, after giving the particulars of a case of double facial paralysis, enters somewhat fully into the more recent opinions of physiologists upon the nerve supply of taste; and, having read his remarks with great interest myself, I thought some *résumé* of the kind might prove interesting to this Society. Cases very similar to Dr. Nixon's are being constantly brought forward in the medical papers, and the conclusions to which they point appear in a more forcible light when the evidence is grouped than when it is isolated.

For a long time the almost universally acknowledged view of physiologists was that the sense of taste was conveyed to the cerebrum by the agency of two nerves—the glossopharyngeal and the lingual branch of the 5th pair—the former presiding over taste at the root of the tongue, the latter at the tip and sides. This opinion was supported by the apparently conclusive evidence



that section of either nerve produced loss of taste in the region it supplied.

The actual result of the experiment was true. The deductions of the experimenters, as is often the case, have been since shown to be mistaken as far as the lingual was concerned. Since the question first became a matter of dispute the controversy has led to many and various opinions being alternately entertained, and then, as evidence accumulated, abandoned. I do not think there is perfect unanimity upon the subject yet, but there is at least a growing inclination to adopt one view among a large section of physiologists.

I would premise that the title of the glosso-pharyngeal to supply the special sense to the root of the tongue never having been disputed I shall not allude to it, and my reference to the sense of taste in the future part of the paper will be understood to mean the sense in the antero-lateral portion of the tongue only.

During the discussion of the question certain important facts have been fully established.

1. Section of the lingual after the chorda tympani has joined it produces loss of common sensation and loss of taste.
2. Section of the lingual before the chorda tympani joins it produces loss of common sensation, but does not affect the sense of taste.

3. Section of the chorda tympani before it joins the lingual produces loss of taste, but does not affect common sensation.

Furthermore, the evidence of disease is that—

1. Complete paralysis of the 5th pair, including of course the lingual, affects sensation, but not taste. (*Vide* Dr. Althaus' case—*Trans. Med. Chi.* Vol. LII.)
2. Paralysis of the 7th pair (due to lesion in its interpetrosal course) affects the sense of taste, but not common sensation. (*Vide* Dr. McDonnell's case—*Trans. Med. Chi.*, Vol. LVIII.)

The evidence by which these facts have been established is so voluminous that it would be impossible to reproduce it here, but if any gentlemen would be interested to hear the particulars of the experiments in the cases of paralysis I shall be happy to quote some of them in my reply.

These facts point at once to one conclusion—that the theory that the lingual *per se* has any influence over the special sense of taste must be abandoned, it being clear that such influence is transmitted to it by the chorda tympani.

Whence, then, does the chorda tympani derive this power over a special sense?

That it has it before it leaves the 7th in the aqueduct of Sylvius is plain from the fact that lesion of that nerve in that situation, either by

disease, as in Dr. McDonnell's and Dr. Nixon's case, or injury, as in the cases of Vizioli, Stick, or Lotzbeck, produces loss of taste.

It is equally evident that the 7th itself cannot communicate the power, for two reasons :

First, because the portio dura is a purely motor nerve, and could scarcely be accredited with a special sense.

Secondly, because central paralysis of the portio dura, or section of it nearer to its origin than the gangliform enlargement, does not affect the sense (Austin Flint, Hughlings Jackson, Hermann).

In the case of the 7th, as with the lingual, the chorda tympani is only a guest, and not an offspring.

The next step in tracing this influence back to its cerebral source was to discover by what channel the chorda tympani joined the 7th.

There are four routes by which it may do so.

1. *Via* the great superficial petrosal from Meckel's ganglion.
2. *Via* the lesser superficial petrosal from the otic ganglion.
3. *Via* the external superficial petrosal from the sympathetic plexus on the middle meningeal.
4. *Via* the "nervus anastomoticus" from the glossopharyngeal outside the stylomastoid foramen.



No. 3 may be dismissed at once, as being simply vasomotor from the sympathetic.

In cases 1 and 2, that is from Meckel's ganglion, or from the otic, we should again be referred to the 5th pair for the original source.

At this point I must allude to a series of experiments by Schiff, undertaken with a view of clearing up this point.

He divided the 2nd division of the 5th above Meckel's ganglion; then the branches going to Meckel's ganglion; then the great superficial petrosal nerve, and finally removed Meckel's ganglion altogether.

His conclusion was that some of the taste fibres at least left the cerebrum with the 5th pair, passing along the 2nd division to Meckel's ganglion, reaching the 7th from thence by the great superficial petrosal, and leaving it as chorda tympani.

In support of this view is the analogy of the horse, in which animal, as was shown by Professor Owen, the great superficial petrosal leaves the portio dura as chorda tympani without becoming incorporated with its fibres at all.

Yet this view has, I think, been shown to be incorrect, both by the experiments of man and of nature.

Vulpian and Prevost repeated Schiff's directions with different results, and showed that after

ablation of Meckel's ganglion the sense of taste persisted. But, after all, dissections involving such extreme nicety are very liable to error. Again, it is difficult to be sure about the persistence or extent of the sense of taste in the lower animals, their power of communicating their impressions being necessarily limited; and valuable as experimental evidence is, evidence derived from the observation of the results of disease or accident upon the human subject is still more satisfactory and conclusive, not only because the dissections are more exact—the experiments, in fact, conducted with greater nicety, and with less implication of other nerves—but also because a human patient can give the observer a better account of his own sensations.

It is then to the results of disease that I now turn for further elucidation of the matter. The two cases I allude to are chosen from very many because of the very high authority upon which they rest, and because they are eminently typical and very conclusive.

In the 52nd volume of the *Med. Chi. Tr.*, Dr. Althaus quotes a case of complete loss of function of the whole of the 5th pair unaccompanied by any other lesion. The loss of common sensation over the front portion of the tongue was so complete that the organ was actually wounded by the teeth without the patient being

conscious of the fact. The sense of taste was quite unaffected, and this was demonstrated by a series of delicate and ingenious experiments, the details of which are given in the Transactions.

The second case is one cited by Dr. McDonnell, also in the *Med. Chi. Tr.* (Vol. LVIII.)

It is a case of paralysis of the 7th, or portio dura, due to disease of its interpetrosal portion. In this case, while common sensation over the front of the tongue was as keen as in the doctor himself or any of the surrounding students, the power of taste in that region was quite lost.

The paper by Dr. Nixon, of Dublin, to which I am indebted for much of the material of the present paper, contains the particulars of a similar case to Dr. McDonnell's.

These are types of numerous cases, all of which show that though the special sense undoubtedly leaves the portio dura by the chorda tympani, it does not reach it from Meckel's ganglion, or from any other part of the 5th pair.

Is there then any other source of influence to the facial besides Meckel's ganglion and the otic? I have already alluded to a communication from the glossopharyngeal reaching the facial outside the stylomastoid foramen, called the "nervus anastomoticus," but this is not the only communication the glossopharyngeal sends to the 7th.

The glossopharyngeal gives off a tympanic



branch which communicates with both the greater and the lesser superficial petrosal nerves between their ganglia and their union with the facial. Here then is an influence reaching the facial by the petrosal nerves which would obviously not be disturbed either by paralysis of the 5th pair or by the removal of Meckel's ganglion. Moreover it is a significant fact that this influence is derived from a nerve (the glossopharyngeal) which has always been regarded as undoubtedly a special nerve of taste.

According to this view then the glossopharyngeal would preside over the whole sense of taste, both at the root and over the tip and sides of the tongue. And I must urge that it seems more in accordance with common sense to refer this taste-sense to the empire of one nerve and not two.

It is more in accordance with analogy, as such a phenomenon as a special sense depending on two nerves is unparalleled in nature. Sight, hearing, smell, each has its nerve specially adapted to convey its special impressions to the sensorium. They are not apparently in need of assistance from a motor or a sensory nerve to carry out their function. Why should it not be the same in the case of taste?

Anatomy shows us an unbroken line of communication between the glossopharyngeal and the tip and sides of the tongue. To recapitulate the

chain, it runs from the glossopharyngeal by the tympanic branch to the petrosal nerves to the facial, leaves the facial as chorda tympani, joins the lingual, and so to the tip and sides of the tongue.

Experimental dissection and disease both point, as I have endeavoured to show, to the fact that if this line of communication be interrupted the sense of taste over that region is lost ; that if the chain of communication be left intact no other dissections or injuries affect the sense.

Analogy would suggest that there is likely to be only one nerve of taste.

The title of the glossopharyngeal to be considered a special nerve of taste has never been disputed.

From the due consideration of these facts I myself can have no hesitation in arriving at this conclusion, as far as the light thrown upon the subject warrants any conclusion, that the glossopharyngeal is the only nerve of taste, and that the 2nd and 3rd divisions of the 5th pair have as little to do with this sense as the 1st division has to do with the sense of sight.

Of course there are many minor difficulties to be cleared up, and I do not doubt that in advancing a view that, although sanctioned by Hermann, Dr. McDonnell, Dr. Althaus, and many others, can scarcely be said to be universally accepted, I lay myself open to questions I may

not be able to answer, and arguments I cannot demolish. I think there is a very strong case for the glossopharyngeal, which will also take much to demolish it.

One more point is of interest, and that is, having discussed what is the nerve of the special sense of taste, to decide what the special sense of taste itself is.

Whether it is a special sense of the same order as the sense of sight, or hearing, or smell?

Whether much of it may not be due to the assistance of the sense of smell? Every one knows how greatly a cold and the subsequent blocking up of the schneiderian membrane and suspension of the sense of smell affect the kindred sense of taste. We all remember the time-honoured practice of holding the nose while taking medicine, and can all speak warmly of the advantages derived from the partial suspension of the sense of taste thereby. Moreover, most substances that excite taste excite smell also, and in most cases the taste very much resembles the smell.

That these facts indicate a close relation between the two senses is clear, but to argue from them that taste does not exist by itself (as has been done) is, I think, straining a point.

The sense of taste is certainly not so specialized—so thoroughly different from common sensation



—as sight or hearing, but I think the difference is due, not to the nature of the nervous fibres, but to the degree of elaborateness in the end organ by which the sensations are transmitted to the nerve.

At one time in intranterine life all nervous elements were very similar. Michael Foster has beautifully described the simplest nerve as being “a strand of highly irritable protoplasm, stretching from one cell to another.” All these strands and their cells were equally susceptible to waves of light or waves of sound, or the sense of touch. Presently various bundles begin to adapt themselves for their special mission, much as medical students, after their general medical education, begin to study specialities, and, forgetting much of the little they ever knew of the other branches of the great profession, devote themselves to become specially skilled and adapted for the special branch that is to be their adult pursuit. In both cases some become more specialized, some remain somewhat generalized, and curiously enough the senses in which the nerves become most specialized are notable fields of speciality for the surgeons—the eye, the ear, and the mouth.

I feel conscious that I have already strained your patience to its utmost, and must thank you very much for having listened so patiently to the lucubrations of so young a member of your

Society ; and may I suggest in conclusion that to deny the existence of the sense of taste would be gross ingratitude, and that it would be hardly less ungrateful to deny the credit of whatever pleasurable sensations we experience through the medium of this sense to the glossopharyngeal nerve.

## DISCUSSION.

The PRESIDENT congratulated Mr. Underwood on his successful paper; he had treated the subject in a very clear and able manner. It was very gratifying to him, as one of the original members of the Society, to find the second generation of old and esteemed colleagues thus coming forward to support it; the fact spoke well for the future prospects of the Society. There were many present who were more capable than himself of throwing light on the subject; he would, therefore, leave them to express their opinions on the points which Mr. Underwood had raised.

Mr. COLEMAN said he felt obliged to confess that during the years which had elapsed since his student days his knowledge of minute anatomy, with reference, for instance, to the communications between the ninth and fifth pairs, had become rather rusty. But he well remembered that, even in his time, the glosso-pharyngeal was generally considered to be the special nerve of taste; whilst the lingual branch of the fifth was thought to supply the tactile papilla on the fore part of the tongue. So that Mr. Underwood's conclusions did not strike him as anything very novel. It must be remembered that much that was generally considered to be taste was really derived from the sense of touch,—as, for instance, the sensations produced by salt, mustard, &c. Then, again, the sense of smell largely assisted the sense of taste. This was well exemplified by the “bouquet” of delicate wines, which was really the impression produced on the sense of smell by the volatile ether which they contained. Mr. Underwood's investigations had, therefore, only confirmed the correctness of what he had been taught—viz., that whilst the eighth nerve was the special nerve of taste, the impressions we derived from it were



greatly assisted by the sense of touch as conveyed by the branches of the fifth ; and by the sense of smell conveyed through the filaments of the olfactory nerve.

Mr. OAKLEY COLES said he should like to ask Mr. Underwood if he had made any investigations as to the power of the soft palate to convey the sense of taste? He remembered reading some very interesting experiments made on a man whose tongue had been completely excised for cancer, by Mr. Annandale, of Edinburgh, which went to prove that the soft palate possessed this power to a considerable extent.

Mr. HUTCHINSON asked Mr. Underwood if he could explain why patients complained that they could not taste when the hard palate had been covered by a suction-plate? If part of the plate was cut away, they said they could taste better. The special nerve of taste was chiefly distributed in the neighbourhood of the papilla circumvallata. Why, then, should the sense of taste be destroyed by covering the hard palate? Had any of his researches thrown any light on this point?

Dr. WALKER said he also had great pleasure in congratulating Mr. Underwood on his interesting and well-digested paper. With regard to the loss of taste which resulted from covering the hard palate, he thought his experience would enable him to offer a tolerably satisfactory explanation. About eighteen years ago he fitted an upper denture for one of the best tea-tasters in the City. For three weeks or a month afterwards this gentleman was almost incapacitated from following his business. Dr. Walker with difficulty persuaded him to continue to wear the denture, and suggested at the same time that in tasting he should place the tip of the tongue between the lips. The manœuvre was perfectly successful, and in a short time the patient was able to do his work as well as before. He believed that the loss of taste was due to the contact of the tongue with a hard dry surface ; moisture was certainly necessary for the clear perception of taste. This explained also the loss of taste which accompanied a cold ; the nose

became obstructed, respiration had to be carried on through the mouth, and the tongue was kept in an abnormally dry state. More recently he had fitted an upper palate for a wine-taster. This patient had at first the same difficulty in following his employment ; but now, by touching the lips with the tongue, he is enabled to distinguish the qualities of wines as well as before.

Mr. OAKLEY COLES said the most curious cases he had met with were those in which patients had lost part of their hard palate, and had at the same time lost their taste ; but they recovered this when an artificial palate was fitted. He believed that the loss of taste which followed the insertion of a hard rubber palate was due to the fact that the tongue came in contact with a hard substance to which it was not accustomed, and that as soon as the tongue became habituated to this novel sensation the power of tasting returned.

Mr. DAVID HEPBURN said that the fact that wearing an artificial denture in the upper jaw would impair the sense of taste might be traced to the same principle which explained the loss of taste which accompanied impaired function of the olfactory nerve—viz., that all the senses worked in concert, each one assisting the others. So if common sensation be impaired the sense of taste was diminished, and in this way an unnatural substance coming in contact with the tongue would indirectly but not the less decidedly affect the sense of taste. He thought that Mr. Underwood appeared to lose sight of the real use of the chorda tympani. The portio dura was essentially a motor nerve, and three of the cephalic ganglia obtained their motor power from it ; thus Mechel's ganglion got its motor supply by the great petrosal, the otic ganglion by the lesser petrosal ; and it seemed to him natural to suppose that the submaxillary ganglion obtained its motor supply by means of this chorda tympani. It seemed to him also more rational to suppose that the fifth nerve had itself the power of conveying a sense of taste than to attempt to explain the fact by such roundabout and complicated connections as Mr. Underwood had endeavoured

to trace. With regard to the support which Mr. Underwood's theory received from experiments on animals, it seemed to him to be a very difficult thing to decide between mere sensation and taste in animals, which had no power of expressing their feelings. Mr. Underwood had said that division of the seventh nerve in the petrous portion of the temporal bone was accompanied by loss of taste; he should be glad to know whether under these circumstances taste was lost on both sides, or only on the side supplied by the cut nerve?

Mr. UNDERWOOD, in reply, said that Mr. Coleman's idea that true taste was only derived from the back part of the tongue, and that the sensation which was mistaken for taste at the tip was a compound of touch and smell, was one which was believed in by some authorities. There was however no doubt that the fore part of the tongue did possess the power of appreciating tastes to some extent. Others, unable to deny this fact, had sought to explain it by supposing that sapid substances placed on the front of the tongue were very quickly dissolved, and that particles were carried back with the moisture. Without denying altogether the correctness of this supposition, the fact remained that a distinct difference in the power of tasting had been observed both after section of the chorda tympani and in patients in whom this nerve had been injured by disease. He thought that the explanation already given of the loss of taste, which followed the insertion of an artificial palate, was probably the correct one—that it was due to the tongue coming in contact with a surface to which it was not accustomed; and that the power would be recovered after a time, as the organ became accustomed to the presence of the foreign body in the mouth. With regard to Mr. David Hepburn's criticisms, time would not allow him to reply to them fully. He could only refer him to the authorities already quoted, feeling sure that if he would read them carefully he could hardly fail to be convinced. Mr. Hepburn had asserted that the chorda tympani was a motor nerve; but Dr. Hughlings Jackson and others had cut this nerve, and then stimulated the peripheral portion



by means of a galvanic battery, with no effect upon muscular movement. It seemed to him quite as unlikely that the tongue should be provided with two motor nerves as that it should have two nerves of taste. Dr. McDonnell's case was especially conclusive on this point. The chorda tympani had been destroyed by disease ; yet, although the patient had lost all perception of taste over the front of the tongue, sensation and motion were unimpaired.

The PRESIDENT, after proposing the usual vote of thanks, which was carried unanimously, announced that at the next meeting (in November) he hoped Professor Flower, of the Royal College of Surgeons, would read a paper, "On some Peculiarities in the Development of the Teeth and Jaws in certain tribes of Circassians and Mongolians."

The Meeting then terminated.



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In page 139, *for* "On the Atmospheric Treatment of Diseased Pulp," *read* "On the Antiseptic Treatment of Diseased Pulp."

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Figure drawn under magnifying power of about 450°.

- a.* Capillary blood-vessels.
  - b.* Trabecula of fibrous connective tissue. In connection with it are numerous fine connective-tissue bundles, taking a more or less curved course. Between these are numerous uni-nuclear round cells.
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### PLATE II.

- Fig. 1. Supernumerary tooth, natural size.
  - Fig. 2. Section of same enlarged two diameters to show apparent second tooth contained inside, marked *a*.
  - Fig. 3. Microscopic Section (Diagramatic).
    - b.* Enamel.
    - c.* Cementum.
    - d.* Dentine.
    - e.* Cavity lined with enamel communicating at *f* with coronal enamel.
    - g.* Mass of secondary dentine containing well-marked lacunæ and canaliculi.
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Portrait of SAMUEL CARTWRIGHT, Esq., F.R.S., First President.

Portrait of JOHN H. PARKINSON, Esq., Second President.





